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# Correlates of Acceptability for Selected Foods among Edmonton Householders

by

© Shirley Jean Coleman

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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**ABSTRACT**

A cross-sectional survey employing a face-to-face interview technique was conducted among a random sample of Edmonton householders to determine factors influencing the acceptability of selected foods. The purpose of the study was to contribute to current understanding of the processes involved in food-related behaviour. The research instrument employed was a standardized questionnaire in which respondents rated 25 foods on each of 17 semantic differential scales and one food use frequency scale. Demographic variables were also collected.

Of the 17 constructs used in the semantic differential scales, nine were found to be important components of overall food acceptability, including: suitable for serving to guests, popular in the family, good flavour, nutritious, safe, desirable in the diet for health, natural, looks good to eat, and generally eaten at home. Factors traditionally assumed to influence food selection, such as cost and convenience, were not found to be important factors in this study. Acceptability was assumed to be a measure of the potential for a food to be selected, and it was found to be a moderately good predictor of frequency of consumption. Popularity in the family, however, was the construct most highly correlated with stated frequency of food consumption.

Of the many socio-demographic variables collected, only one, restrictions on food intake for health reasons, had a significant influence on the overall acceptability of more

than three foods. A factor analysis of the data showed that the original 17 constructs were in fact measuring only five underlying concepts. Grouping the constructs by factor analysis indicated how respondents defined the various constructs.

The visual representation of the apparent meanings of the various foods to the respondents was illustrated by image profiles. These profiles were based on the mean scores for all 17 constructs. Comparisons between image profiles of related foods or intended food substitutes or replacements revealed useful information on consumer perceptions of the foods that could be used in nutrition and food education programmes.

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# I. INTRODUCTION

The need to educate consumers about nutrition and food safety has been expressed by many diverse groups, such as consumers themselves, the food industry, (Dymsza *et al.*, 1974; Hall, 1977), nutritionists (American Dietetic Association, 1978), and various government agencies. This need has been emphasized in the recommendations of several Canadian government reports, including: "Food Safety Assessment" (Canada, 1975), "Food Strategy for Canada" (Canada, 1978), "Nutrition Canada" (Canada, 1973a), "New Perspectives on the Health of Canadians" (Canada, 1974), and "What Price Nutrition?" (Food Prices Review Board, 1975). These reports cited evidence of unsatisfactory nutritional status, eating habits, food buying practices and food handling procedures by Canadians, and they recommended consumer education programmes as a means of alleviating these problems. Undesirable food habits are suggested as one of the components of our modern lifestyle that is closely linked with our current major health problems. A recent report, "Nutrition and Health in Canada" (Canada, 1979a), suggested that up to 40% of the funds spent in Canada on health care are spent on "nutrition related health problems", including iron deficiency anaemia, malnutrition, diabetes, obesity and cardiovascular disease.

If consumer education programmes are expected to achieve improvements in food habits, they must be designed to do more than provide information about food safety and

nutrition. The assumption that providing information will result in changes in food practices has been seriously criticised (Anderson *et al.*, 1977; Celendar and Sloan, 1977; Evans and Hall, 1978; Lauzon, 1977; Mahoney, 1978; Schwartz, 1975; Sims, 1976; Staelin, 1978; Steuart, 1976; Zimmerman, 1972).

Brown and Dimsdale (1973) suggested that consumer education programmes based solely on knowledge dissemination failed to achieve behaviour changes, because consumer educators often lack understanding of the wants, needs, and motivations of consumers. In the absence of such understanding, consumer educators make too many assumptions, design programmes based on these assumptions, with the result that programme goals are not realized. A review of nutrition education programmes from 1900 to 1970 showed that the main emphasis was dissemination of information, and it was assumed that an improvement in nutrition knowledge would result in an improvement in food practices (Guthrie, 1978; Whitehead, 1973). Food-related behaviour, however, is very complex, and is affected by many other factors besides knowledge (Guthrie, 1978). It is evident that more information about factors influencing food practices, consumer perceptions of foods, and consumer needs from the consumer perspective is required for the design of information and education programmes that will result in changes in food practices (Brown and Dimsdale, 1973; Somers, 1977).

## II. REVIEW OF THE LITERATURE

### A. Introduction

The limited success in achieving the goal of permanent changes in food practices led researchers in food and nutrition to seek a better understanding of food-related motivations and behaviour. An individual's food practices (food selection, preparation, storage, consumption, etc.) are thought to be part of a complex behaviour system (Anderson *et al.*, 1977; Schafer and Yetley, 1975), as illustrated in Figure 1. This model is an attempt to take into consideration the many factors influencing food practices, and can be used as a theoretical framework.

The Food Behaviour System model illustrates that food-related behaviour is influenced by information from two sources, the "External Environment" and the "Internal Environment". Information from these two environments forms the basis for an individual's food knowledge, attitudes, and preferences (Anderson *et al.*, 1977; Schafer and Yetley, 1975; Sims, 1976). Knowledge, attitudes, and preferences are processed (interpreted) by individuals according to their unique, psychological frames of reference. The results of these interpretations are some type of food-related behaviour (Schafer and Yetley, 1975; Steuart, 1976). This behaviour, in turn, results in satisfaction or dissatisfaction, and this is fed back into the system as new information that may influence subsequent behaviour.

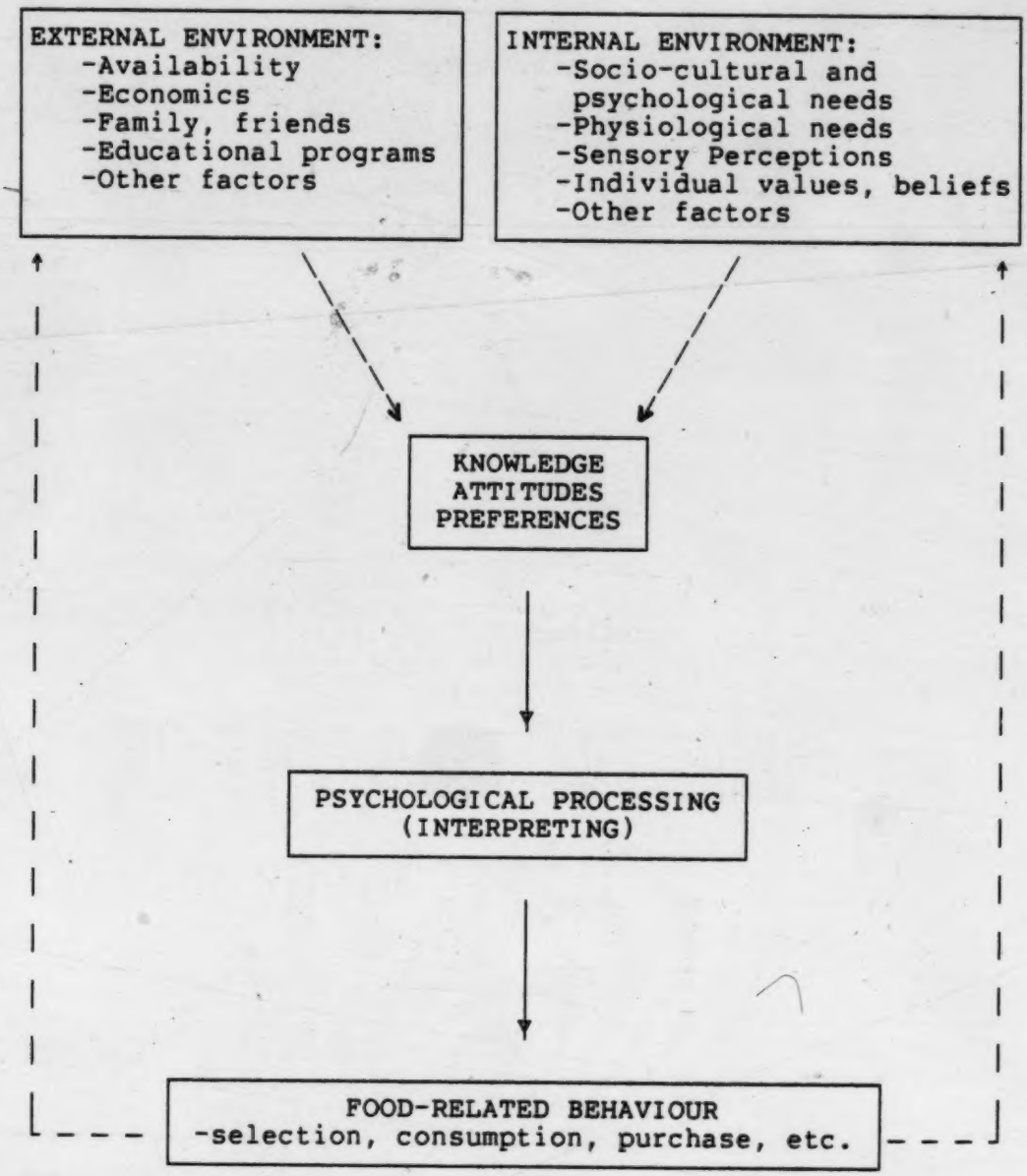



Figure 1. Food Behaviour System model as described by Anderson *et al.* (1977).

Individuals generally try to avoid disruptions to their stable frames of reference, and may reject or misinterpret information that does not "fit into" these structures (Sheth, 1974). This may explain, in part, why information given to consumers that "should" produce a behaviour change, does not necessarily lead to the expected change.

As described in the food behaviour model, a food practice (for example, selection of a certain food) may satisfy many kinds of individual needs (Celendar and Sloan, 1977; Lachance, 1978; Lamb, 1969; Lowenberg, 1970; Rand, 1976; Schafer and Yetley, 1975). Because of this, various meanings become attached to foods (Lowenberg, 1970, 1974; Niehoff, 1969). These meanings may be totally unrelated to the composition or nutritional value of the food, may be unconscious, and may simply be expressed as a food like or dislike. Consumer perceptions of foods are numerous, and include the following: protein means strength; eggs result in heart disease; milk is for babies; pop is more fun to drink than water; bread is fattening; carrots are for seeing in the dark; broccoli and cauliflower are for adults; everything that is processed or that is suitable for dessert is "junk"; steak is associated with men; jellied salad is associated with women; and, candy is associated with good behaviour (Lachance, 1978; Rand, 1976). By attaching such meanings to foods, individuals are defining which foods are prestigious, which ones are appropriate for specific occasions, who should and should not eat certain foods,

which foods have special qualities, and how foods should be prepared and eaten. However "illogical" some of these consumer perceptions may seem, they can have a marked influence on food behaviour.

## B. Factors Influencing Food Choices

The Food Behaviour System model (Figure 1) can be used to integrate knowledge gained about various aspects of food-related behaviour. Data gathered specifically about food consumption, food preferences, sensory perceptions of food, or any other components of the model can make a contribution to the understanding of the total system. There are at least two types of methodologies that have been used to study factors involved in the Food Behaviour System, a direct and an indirect approach (Schiffman and Kanuck, 1978). When using a direct approach, the researcher asks respondents to state factors that influence food choices, or to rank a set of factors according to their relative importance as influences on food behaviour. Studies using a direct approach have been designed to determine factors influencing selection of food in general and those concerned with specific foods or food types.

### 1. Factors Influencing the Selection of "Food in General"

Schafer (1978) studied influences on food behaviour between married couples. Influences were classified as (a) intrinsic, which included personal preferences and your health; (b) internal to the family, and (c) external to the

family. The intrinsic factor "personal preference" was rated as having the most influence by both husbands and wives. Other influences were rated as follows (in descending order of importance): health of family members, spouse, your health, and cost. Schafer defined personal preference as consisting of twelve components. Respondents were asked to rank the relative importance of each of these components to overall personal preference. Husbands ranked taste first, nutrition a distant second, cost third, and then health; wives ranked nutrition first, taste a close second, then cost and health. The remaining components were ranked differently by men and women.

Food habits of individuals over 65 years of age were studied by Brown (1976). The respondents gave the following as motivations for choosing foods: taste and enjoyment (50% of the sample), good nutrition and energy (26%), habit (8%), to keep from starving (8%), and dietary restrictions (14%).

Consumer motivation for selection of "health foods" has also been studied. Bremer and Weatherholz (1975) carried out a survey of attitudes and reported practices of university staff and students. Of those who did not buy "health" or "organic" foods, 92% of respondents selected foods on the basis of taste or personal preference. Of those who did buy "health foods", 62% claimed to do so for reasons of taste and personal preference, but 25% selected these foods for reasons of nutritional value. In a survey of "health food" users by Rhee and Stubbs (1976), the most frequently cited

motivating factors for selecting "health foods" were: healthfulness, personal preference, nutritional value, and, as an aid to specific disease conditions.

Green (1975) studied consumer "concerns" about foods. Respondents were asked open-ended questions and volunteered the following "concerns": prices, packaging, quality, processing, additives, nutritional value, advertising, labelling and food contaminants. Cosper and Wakefield (1975) studied the degree of influence that 13 personal and non-personal factors had on the selection of a new food among Kansas homemakers. It was found that the respondent's husband exerted a significantly stronger influence than any other factor; the next most influential factor was professionals, followed by other family members and friends. The characteristics easy to prepare, new or unusual, low in calories, and reduced in price, were considered by respondents to exert less influence than the personal factors of family and friends. The respondents in this study perceived that advertising would have significantly less infuence than any other factor.

**2. Factors Influencing the Selection of Specific Foods**

In a study of factors influencing the selection of bread, Martinsen and McCullough (1977) reported that the four most important criteria used by consumers were, in order of importance: flavour, nutritional value, price and freshness. The relative importance of factors influencing selection showed a shift in consumer priorities compared

with a similar study completed in 1974; in the earlier study, flavour and price were the most important criteria, while nutritional value was relatively unimportant.

In another study, Cosper and Wakefield (1975) instructed homemakers to select one of ten motivational factors that they considered most influential in the selection of foods, in each of six categories. The ten motivational factors were: I like it, family likes it, tastes good, low in cost, good for you, easy to fix, nice to look at, different, not fattening, and, other reasons. Averaging the results for all food categories indicated that family preference was chosen by 36% of respondents, personal preference by 27%, good for you by 13%, and tastes good by 9%. The other six motivational factors had a minor influence on food selection. Although some differences existed between the main motive selected for each food category, family and personal preferences were ranked first and second for all food categories.

These studies employed the direct approach to determine factors influencing food selection, and they indicated that family food preferences (an external variable); taste of the food (an internal variable); and, the healthfulness or nutritional value of food (representing knowledge held about the food), appeared to be the most important factors. There are two major disadvantages of the direct approach of determining these factors. Firstly, respondents may not be aware of the real forces that influence food choices, and

therefore, individuals may "unconsciously rationalize their actions" when asked direct questions about them (Schiffman and Kanuk, 1978, p. 49). Secondly, when respondents know what the researcher is trying to learn, and especially when respondents think they know the right (acceptable) answer, they may try to please the researcher with that answer (Schiffman and Kanuk, 1978).

Because of the limitations of direct questioning, some researchers have used indirect techniques in an effort to determine underlying motives of food selection (Frost and Braine, 1967). One such indirect technique was used to determine factors influencing meat selection (McFadyen, 1972). The technique was based on the principle that factors used by individuals to describe similarities and differences between concepts (for example, foods) are important factors to the individual, and therefore have the potential to influence behaviour. This technique, called the Repertory Grid Technique, is based on the Personal Construct Theory of G.A. Kelly (Bannister, 1962; Frost and Braine, 1967). Each personal construct is thought to exist in an individual's frame of reference as a continuum, eg. light to heavy. The advantage of the Repertory Grid Technique is that the respondents are not being led in any way in their answers, and yet they have described constructs, expressed in their own words, that are actually used to assign meanings to concepts (Frost and Braine, 1967).

Using the Repertory Grid Technique, McFadyen (1972) interviewed 60 consumers to obtain personal constructs used to differentiate meat types. These constructs expressed a variety of aspects about meat such as its cost, nutritional value, acceptability, quality and uses. McFadyen further evaluated these constructs and found that those expressing tenderness, nutritive value, and suitability for guests were the most strongly associated with her measure of acceptability of meats. Respondents in this study also indicated that nutritive value was closely associated with perceived fat content.

The Repertory Grid Technique was also used by Martin (1976) in an exploratory study designed to determine personal constructs used by consumers to evaluate a wide variety of foods. A total of forty-three constructs were reported. These could be classified into sixteen categories including such topics as acceptability, cost and quality, preparation and storage, uses, nutrition and safety, and availability.

The preceeding studies, each employing the indirect approach, found some of the same factors as studies using the direct approach, e.g. nutritive value of foods, cost and sensory characteristics such as taste and texture. A factor found by McFadyen, that was not reported in direct studies, was the construct "would not serve to guests - would serve to guests". This was considered to be an expression of prestige that influences food selection.

Fewster *et al.* (1973) researched the literature on nutrition, anthropology and social psychology for factors that might influence food practices. The search yielded twelve major categories of meaning associated with foods and food habits. These categories included such topics as economics, convenience, sensory qualities of food, symbolism, concerns for health and food value, as well as influences of age, sex, and "status-groups".

Factors influencing food practices were also reported by Krondl and Lau (1978). They reported nine identifiable factors: society, tolerance, taste, familiarity, prestige, price, convenience, health belief, and nutrition knowledge. These workers also proposed a model of food behaviour in which these nine factors or motives were viewed as being the result of knowledge, attitudes and preferences that individuals learn or acquire.

A large number of factors influencing food selection have been reported, and appear in Appendix A. These factors were examined and those similar in meaning were grouped together into fourteen categories of topics. These categories represent a summary of factors from a broad range of studies of foods and nutrition, and will be used as the source of factors to be included in the present study.

## C. Socio-demographic Characteristics and Food Selection

Studies employing both direct and indirect methodologies have indicated that socio-demographic characteristics influence consumer knowledge, attitudes, preferences and practices related to food. Age, level of education, income, sex, ethnic background, and family variables might all be expected to influence food selection (Anderson *et al.*, 1977).

### 1. Age

In studies of adults, age was found to be negatively correlated with measures of nutrition knowledge, knowledge of food additives, degree of concern for preservatives in foods and with reported use of "acceptable nutritional practices" (Fusillo and Beloian, 1977; Jalso *et al.*, 1965; Martinsen and McCullough, 1977; Zibrik *et al.*, 1978). A recent government study showed that while age was negatively correlated with knowledge about food additives, it was positively correlated with degree of concern for the additives in food (Canada, 1979b). Attitudes toward meats were shown to differ with age of respondent (McFadyen, 1972), and age has been shown to influence the frequency of use of certain foods (Martinsen and McCullough, 1977). Age influenced both attitudes toward, and use of "organic" foods (Bremer and Weatherholz, 1975). In the Nutrition Canada survey, age was found to influence both quantity of food consumed and patterns of food consumption (Canada, 1973b).

**2. Education**

The amount of formal education, generally measured as years of education and (or) level achieved, has been shown to relate positively with level of knowledge about foods and nutrition (Brown, 1976; Canada, 1979b; Cosper and Wakefield, 1975; Fusillo and Beloian, 1977; Zibrik *et al.*, 1978). Level of education was found to be positively correlated with concern for the use of food additives (Canada, 1979b), and also with degree of awareness of mailed food and nutrition education (Butler-Bush and Sabry, 1977). Although Zibrik *et al.* (1978) reported a greater knowledge of food additives as level of education increased, Martinsen and McCullough (1977) reported that concern about the use of preservatives in foods also increased as level of education increased.

The extent of food and nutrition-related education has also been examined for its effect on knowledge of foods and nutrition. Schwartz (1975) found that female high school graduates who had taken a Home Economics course in Foods and Nutrition, did not achieve higher scores with respect to nutrition knowledge, attitudes or reported practices, when compared with graduates who had not taken such a course. University students with courses in nutrition or biochemistry were found to be more sceptical of "organic" foods than others, however their level of nutrition knowledge was no greater than that of other students (Bremer and Weatherholz, 1975).

Evidence of the influence of level of education on food practices is conflicting. For example, Haley *et al.* (1977) reported that the nutritional adequacy of food intake of school children was favourably related to the educational level of their parents, and Jalso *et al.* (1965) reported that the nutritional adequacy of intake and the attitudes of homemakers were positively related to level of education. In contrast, a study of senior citizens (Brown, 1976) revealed that while nutrition knowledge was influenced by level of education, selection of a nutritionally adequate diet was not. Level of education did not influence the criteria used for selection of bread, nor for the frequency of use of six other foods (Martinsen and McCullough, 1977).

**3. Income**

Alexis *et al.* (1969) reported that family income influenced the amount of money spent on several food items, and, that income level was positively related to amount of money spent on food eaten away from home. A recent report on nutrition and food practices of Canadians established that the percentage of income spent on food away from home increased with total family income (Canada, 1979a). Sims (1976) reported that homemakers' level of nutrition knowledge was inversely related to amount of money spent weekly on food. However, income was not reported to be an influential factor by Martinsen and McCullough (1977). Myers and Kroetsch (1978) analyzing Nutrition Canada survey data found significant associations between an income index

(based on total family income and household size) and food consumption patterns. As income decreased, the number of servings from both the meat and the fruit and vegetable groups decreased. Higher income groups obtained most of their vitamin C from fruit, whereas the lower income groups obtained a greater proportion from potatoes.

**4. "Socioeconomic Status"**

The foregoing factors (education and income) are often combined with occupation and sometimes with quality of neighbourhood, value of residence and quality of possessions, as a measure of "socioeconomic status" (Schiffman and Kanuk, 1978). However, socioeconomic status is not always defined in the same way, and, therefore, it is not always comparable between studies (Babbie, 1973). Measures of nutrition knowledge and attitudes toward nutrition of adolescents were positively related to socioeconomic status of the family (Thompson and Schwartz, 1976). Socioeconomic index was reported to be positively related to nutrition knowledge, with the occupation and education components of this index having a stronger influence than income (Sims, 1976). Grotkowski and Sims (1978) reported that the use of "health foods" and nutritional supplements was higher among senior citizens of higher, than those of a lower socioeconomic status.

The terms "social status" and "social class" have also been used in the literature to describe the combination of income, education, and occupation characteristics (Babbie,

1973; McCarthy and Shapiro, 1975). Although the use of these terms has generally not been standardized, the idea of some combination of education, income and occupation has proven useful in studies of buying behaviour. Individuals from different socioeconomic groups have been shown to exhibit different behaviour in the marketplace (McCarthy and Shapiro, 1975).

**5. Sex**

Schafer (1978) reported differences in attitudes of male and female marriage partners in the ranking of twelve factors considered to be components of personal preference. Differences in awareness and knowledge of nutrition, and in food preferences and intake were found between sexes in studies of adolescents (Anderson *et al.*, 1977; Thompson and Schwartz, 1976). The Nutrition Canada survey recorded differences not only in quantity of foods consumed between the sexes, but also differences in frequency of consumption of particular foods (Canada, 1973b). Different foods have also been reported to have different symbolic meaning between the sexes (Dichter, 1964). A study of consumer opinions about food additives showed that women expressed a greater degree of concern regarding the use of food additives than did men (Canada, 1979b).

**6. Ethnic Background**

Ethnic background would be expected to influence food habits (Barer-Stein, 1979; Canada, 1979a), however, the specific influence of ethnicity on current Canadian food

practices is not well documented.

**7. Family Characteristics**

Age of children has been reported to influence degree of nutrition knowledge and awareness of mailed nutrition information of the homemaker (Butler-Bush and Sabry, 1977; Sims, 1976). Age of children is a component of the Stage in Family Life Cycle, a compound variable made up of marital status, age of family members, number of children and work status of the head of household (Block and Roering, 1976; Cross *et al.*, 1975; Schiffman and Kanuk, 1978). Generally, homemakers' awareness of information on food and nutrition was inversely related to family size (Butler-Bush and Sabry, 1977; Sims, 1976).

## D. Conclusions

Current knowledge about individual food practices has been summarized by Anderson *et al.* (1977) in their representation of the Food Behaviour System (Figure 1). A variety of studies have contributed to our understanding of the factors that operate in such a System. By grouping similar factors found in the literature, fourteen major categories of factors, and seven types of socio-demographic characteristics have been identified (see Appendix A). Although both direct and indirect approaches to determining factors have shown similar results in some cases, an indirect approach is thought to produce factors that are less biased, therefore more valid. A more complete

understanding of the nature of the many factors that influence food practices is needed by food and nutrition educators, so that their programmes can be designed on the basis of consumer perceptions and needs, rather than on the basis of educators' assumptions.

## III. OBJECTIVES

The objective of this study was to determine factors influencing food preferences for a selected group of foods, and to explore possible interrelationships between these factors. It was anticipated that the study of these factors would contribute to the understanding of the processes involved in food selection, and that the information would be of value for further understanding of consumer attitudes to foods, and to food and nutrition educators. More specifically the study was designed to determine:

a. Which factors (from a predetermined set of factors shown to influence food choices) are most strongly associated with acceptability for a group of selected foods, among Edmonton householders?

b. What patterns of association exist between the factors in this set, and do these patterns contribute to an understanding of the meanings that householders have for these factors?

c. Does acceptability of foods differ between groups of householders who differ in socio-demographic characteristics shown to influence food choices?

d. Does acceptability of a food predict frequency of consumption?

e. What meanings do householders attach to selected foods?

## IV. DEVELOPMENT OF RESEARCH INSTRUMENT

### A. Bases for Selection of Items for the Research Instrument

The research instrument was developed taking into consideration the following explanations of approach and concepts expressed in the research questions (Chapter III).

#### 1. Factors that Influence Food Selection

To achieve the objective of this study, it was necessary to select a set of factors, small enough to study, yet representative of the various categories identified in Appendix A. To select the factors, the following criteria were used:

i) to represent as many of the fourteen major categories as possible (Appendix A);

ii) to include as many factors as possible that have been found by the indirect Repertory Grid technique;

iii) to include factors that were found in several studies, and therefore appear to be the most important.

#### 2. Selected Foods

Foods in the modern market place include an extremely large number of items, making it impossible to study them all. Because the purpose of this study was to provide information for consumer education programmes, recommendations and guidelines given in nutrition education materials were used as a framework for food selection. Recent Canadian

reports (Canada, 1973a, 1976, 1977, 1978, 1979c) documenting nutritional and food safety problems have proposed strategies to improve eating habits and to increase or decrease the intake of certain food types. Similar recommendations have been made by Canadian researchers (Anderson *et al.*, 1977; Blanchet, 1978; Haley *et al.*, 1977), and by workers in the United States (Fewster *et al.*, 1973; Grotkowski and Sims, 1978; LaChance, 1978; Parrish, 1971; Somers, 1977).

In general, recommendations are made to decrease consumption of foods high in fat (especially from animal sources), sugar and salt, and to increase consumption of milk and milk products (especially those of a lower fat content), whole grain cereal products, meat alternates, and fruits and vegetables. Within this framework of nutrition recommendations, the first stage in selecting specific food items for this study was to include a variety of foods from various food categories. In addition, it was decided to include some foods from each of the four food groups of Canada's Food Guide, as well as some foods not included in any of the groups (that is, foods that are primarily fat and (or) sugar). Within each of these categories, the following guidelines were used for selection of specific foods, based on Osgood *et al.*'s (1971) guidelines for selection of concepts:

i) foods should be clearly described and understood;

ii) the foods should be relatively common so that most householders would be familiar with them; and iii) foods should be specific, but no brand names should be used.

**3. Householders**

The unit of analysis for this study was the household, based on the Statistics Canada (1978) definition that this include any person or group of persons who occupy a dwelling and do not have a usual place of residence elsewhere in Canada. Within each household, the respondent was the person who claimed to make the majority of decisions regarding foods that are available and served. In other studies, this individual has been considered to represent most accurately the food knowledge, attitudes, preferences and practices of the household (Schafer, 1978; Sheth, 1974; Lowenberg, 1974).

**4. Frequency of Consumption of a Food**

The frequency of eating a food was defined for this study as the score on a seven point scale of frequency of consumption, ranging from "have never tasted" to "eat daily" (Krondl and Lau, 1978). This food use frequency scale was a measure of reported consumption of foods. It is recognized that reported consumption may differ from actual consumption.

B. **Factor Selection**

Using the criteria outlined above (A.1), 20 factors were selected for further study. Many of the factors selected were already expressed as bipolar constructs, because they had been found by the Repertory Grid technique. Therefore, for uniformity, all 20 factors were expressed in this form (see Table 1).

C. **Selection of Specific Foods**

Forty foods were selected (see Table 2) using the decision-making process described previously. Within some of the food groups, foods were selected because nutrition educators recommend substitution of one for another to bring about a desired goal. Examples of such foods are: skimmed or 2% milk as substitutes for whole milk, and yogurt as a substitute for ice cream to achieve reduction in fat and caloric content; boiled potatoes as a substitute for french fried potatoes to achieve a caloric reduction; baked fish, turkey or baked beans as substitutes for popular meats higher in fat, such as roast beef; whole grain breads and cereals, such as shredded wheat, as substitutes for refined cereal products, such as corn flakes, white bread and some sweetened cereals, to achieve an increase in fiber intake; and, fruit such as apples or raisins are suggested as substitutes for pie or cake to achieve a lower caloric intake.

Table 1. Factors influencing selection of foods that were selected for inclusion in the research study

| Major Category | Constructs |
|---|---|
| Overall acceptability | would not likely eat - would likely eat |
| Satiety | not filling - filling |
| Aesthetic-Sensory | has a bad flavour - has a good flavour |
| | looks bad to eat - looks good to eat |
| Familiarity | not familiar with - very familiar with |
| Health and Safety | not essential in diet for health - essential in diet for health |
| | not safe to eat - safe to eat |
| Symbolism | food for a snack - food for a main meal |
| | generally eat at home - generally eat out |
| | basic everyday food - special occasion food |
| Guests | would not serve to guests - would serve to guests |
| Price | expensive - not expensive |
| Preparation-related | takes little time to prepare - takes a long time to prepare |
| | not many ways to prepare - many ways to prepare |
| Nutritional Value | low food value - nutritious |
| | fattening - not fattening |
| | artificial - natural |
| | processed - unprocessed |
| Personal and Family Preferences | don't like - like |
| | not popular in family (household) - popular in family (household) |

Table 2. Foods selected for inclusion in the research study

| Food Group | Specific Food |
|---|---|
| Milk and Milk Products | whole milk, 2% milk, skim milk', yogurt, ice cream, cheddar cheese, cottage cheese |
| Bread and Cereals | whole wheat bread, white bread, shredded wheat cereal, corn flakes, oatmeal (cooked cereal), sweetened ready-to-eat cereal |
| Meat and Alternates | baked fish, deep fried fish, turkey, eggs, roast beef, peanuts, baked beans, peanut butter, pizza, bologna, weiners |
| Fruits and Vegetables | boiled potato, french fried potatoes, green (tossed) salad; fresh, canned, frozen corn; fresh, frozen broccoli; apples, apple pie, raisins, orange juice |
| High Fat and/or Sugar Foods | carbonated beverage (pop), cake, chocolates, potato chips |

'although the proper term is "skimmed milk", the term "skim milk" has become popular, and it was felt that this would be the more familiar term to consumers.

Some of the foods were included because of researcher interest, for example: foods representing a variety of cooking procedures, such as baked and deep-fried fish; foods representing a variety of processing methods, such as fresh, frozen and canned corn, and fresh or frozen broccoli; examples of more popular and familiar vegetables (salad, corn) and a vegetable that may be less popular (broccoli); and, foods about which some concern has been expressed, such as cholesterol in eggs, additives in bologna.

D. Selection of Socio-demographic Characteristics

There were two main reasons for collecting the socio-demographic data:

i) to describe the characteristics of the sample and to compare them to other statistics available for Edmonton residents; and,

ii) to find socio-demographic characteristics that allow the sample to be divided into groups that are large enough for reliable comparisons to be made between them.

Socio-demographic characteristics have been reported to influence food-related behaviour, but there are no clear indications in the literature of their relative importance in food acceptability. Therefore, as many of these characteristics as was practical were included in the questionnaire. The personal, family, socioeconomic, and food-related characteristics included are shown in Table 3.

Table 3. Socio-demographic characteristics included in the research study

| Characteristic | Question Asked |
|---|---|
| age of respondent | year of birth |
| level of general education (respondent and spouse, if applicable) | pre-coded list of schooling levels, ranging from some primary school to graduated from university |
| food and nutrition-related education of respondent | classes or courses in food and/or nutrition |
| sex of respondent | recorded by interviewer |
| ethnic background of household | place of birth of respondent<br>number of years respondent has lived in Canada<br>main language spoken in the home<br>other languages spoken in the home |
| total income of family (for 1978) | pre-coded list of incomes (before tax and deductions), ranging from under $2,000 to $30,000 or more |
| work-status (respondent and spouse) | work done outside the home (full or part-time), or school attendance |
| occupation (respondent and spouse, if applicable) | name of occupation |
| marital status | married or single |
| numbers and ages of children | number of children living in the household full-time; age of oldest and age of youngest |
| household size | number of people living in household full-time and relationship to respondent |
| food restrictions | reasons food intake may be restricted by any member of household |

**E. Measurement**

In order to satisfy the objectives of this study it was necessary to establish methods whereby the relative importance of, and inter-relationships between, the selected factors could be measured. An indirect, rather than a direct method was selected to study these relationships. The method selected was the procedure for quantitative measurement of meanings of foods suggested by McFadyen (1972), Fewster *et al.* (1973), and Krondl and Lau (1978). This procedure began by requesting respondents to rate the selected foods against each of twenty factors, thereby establishing a multi-dimensional meaning for each food (Fewster *et al.*, 1973). Then, foods were classified according to acceptability, defined as the rating given on the construct "would not likely eat - would likely eat" (McFadyen, 1972). The acceptability of a food was thought to be an indicator of the probability that the food would be selected. By examining the multi-dimensional meaning (i.e. the set of judgements on each construct) of a food rated as highly acceptable, it is possible to predict which characteristics of that food are important components of acceptability (Fewster *et al.*, 1973).

To establish a multi-dimensional meaning for each food, each of the twenty bipolar constructs was transferred into rating scales. The procedure for measuring the direction and the intensity of a point along the continuum of a construct was described by Osgood *et al.* (1971). The constructs were

expressed on a five point semantic differential scale, as follows:

POLAR TERM X (___1):(___2):(___3):(___4):(___5) POLAR TERM Y

Meanings associated with each term:

1. Very X
2. Somewhat X
3. Neither X nor Y
4. Somewhat Y
5. Very Y

Osgood *et al.* (1971) recommended a seven-point scale for most situations, but he noted that five or nine points could also be used. A five-point scale was found to be suitable in previous studies of the meanings of foods (Krondl and Lau, 1978; McFadyen, 1972).

Where possible, measures of the socio-demographic characteristics followed standardized procedures as suggested in the Canada Council report of the Consultative Group on Survey Research (Canada Council, 1976).

## F. Development of the Questionnaire

A two-part questionnaire was developed as the data-collection instrument. Part 1 consisted of the twenty semantic differential scales, the food frequency scale, and the forty foods, and was self-administered under the supervision of an interviewer. Part 2 was a standardized schedule of socio-demographic questions and was completed by

the interviewer.

**1. The Pretest**

The questionnaire was pretested with a group of twenty-five respondents. There were five objectives for carrying out the pretest:

i) to estimate time required to complete it, to detect ambiguities, and to obtain general comments that might be used to improve the questionnaire;

ii) to check the use of a separate "do not know" option for each semantic differential scale. Traditionally, this option is not available to respondents, however, it was thought that if the "do not know" option were available, and were used by respondents, constructs or foods that were confusing could be detected and eliminated or modified;

iii) to determine if a modified arrangement of the Semantic Differential would bias responses. The usual arrangement consists of placing the concept to be judged at the top of a page and the rating scales beneath (Osgood *et al.*, 1971). The alternate arrangement consisted of placing a bipolar scale at the top of the page and the foods beneath. An advantage of the modified format was that it required only twenty-one pages (one page per scale), compared with the traditional format that required forty pages (one page per food).

Such a reduction in the length of a questionnaire could be an important factor in obtaining cooperation from respondents (Smith, 1975). To determine whether or not the modified format biased responses, five of the selected foods were repeated in the pretest in the traditional format. Responses for these five foods were then compared with those for the same foods presented in the modified format;

iv) to determine seasonal influences on reported consumption of foods;

v) to determine the reliability of the modified format. Osgood *et al.* (1971) found that for test-retest reliability, the "....average errors of measurement of the Semantic Differential Scales are always less than a single scale unit...., which for practical purposes is satisfactory" (p. 131). To test the reliability of the modified format, five pages of the questionnaire were repeated.

The respondents for the pretest were selected in an effort to obtain a variety of backgrounds for age, educational background, knowledge of foods and nutrition, and experience in questionnaire development. Twenty-four females and one male respondent completed the pretest.

**2. Results of the Pretest**

Part 1 required approximately eighty minutes to complete, and Part 2 required five to ten minutes. It was considered that the questionnaire should not require more than forty minutes to complete. The process of reducing the length of the questionnaire was aided by feedback from respondents. Some of the constructs and foods were judged by respondents to be either ambiguous or redundant and were excluded. The number of foods was reduced to a greater extent than the number of constructs, to be consistent with the objective of the study. The foods that were selected for the final version of the questionnaire, however, were chosen so that the five food categories previously described were represented. The pretest also led to some clarification of instructions, wording of bipolar terms and description of foods. When clarifying the bipolar terms, all possible attempts were made to retain the original wordings of the constructs that were found by the Repertory Grid technique. Changes were also made to bipolar constructs with distorted distributions of scores. The constructs and foods retained for Part 1 of the questionniare are listed in Table 4.

The "do not know" option was used infrequently and inconsistently by respondents in the pretest. Upon questioning, pretest respondents stated that they used it with foods that they did not usually eat. Respondents stated that they would have little trouble selecting one of the blanks on the scale if the "do not know" option was not

Table 4. Constructs and foods selected after the pretest for use in the questionnaire[1]

a) Constructs

| | |
|---|---|
| has a bad flavour | has a good flavour |
| looks bad to eat | looks good to eat |
| not desirable in diet for health | desirable in diet for health |
| less safe to eat | safe to eat |
| food for a snack | food for a main meal[2] |
| a food generally eaten in the home | a food generally eaten away from the home[2] |
| basic, ordinary food | special occasion food[2] |
| would not serve to guests | would serve to guests |
| expensive | not expensive |
| not a food a person can serve if short of time | a food a person can serve if short of time |
| not many ways to use | many ways to use |
| low food value | nutritious |
| fattening | not fattening |
| artificial | natural[2] |
| processed | unprocessed[2] |
| not popular in family (household) | popular in family (household) |
| would not likely eat | would likely eat |

[1]Constructs are arranged from negative to positive poles.

[2]Polarities were arbitarily selected based on researcher interpretation of construct meaning.

Table 4. (Continued)

b) Food Consumption Frequency Scale

| Never Tasted | Never | Less than once a month | Once a month | Once a week | A few times a week | Daily |
|---|---|---|---|---|---|---|
| ___ | ___ | ___ | ___ | ___ | ___ | ___ |

c) Foods

| | |
|---|---|
| Milk and Milk Products | 2% milk, skim milk, yogurt, ice cream, cheddar cheese |
| Meats and Alternates | roast beef, eggs, baked fish, baked beans, turkey, bologna |
| Breads and Cereals | white bread, whole wheat bread, shredded wheat cereal, sweetened ready-to-eat cereal |
| Fruit and Vegetables | tossed green salad, fresh corn, frozen corn, canned corn, orange juice, boiled potato, french fried potatoes |
| Foods high in Fats and/or Sugars | pop (carbonated soft drink), potato chips, chocolate cake |

available. It was concluded that this option did not provide additional information and, therefore, it was not included in the final version of the questionnaire.

Mean scores on those foods and constructs that were repeated in the traditional format were calculated. Differences were very small, averaging 0.17 of a scale unit; there was no observable trend in the direction of these differences. Because differences were less than the acceptable difference of one scale unit as described by Osgood *et al.* (1971), it was concluded that the modified format did not bias responses appreciably and it could be used in the final questionnaire without influencing the results.

Of the 25 foods retained for the final questionnaire, the consumption of four of these, ice-cream, pop, fresh corn, and turkey, were considered by at least one-third of the pretest respondents to be influenced by season of the year. Because these influences were probably true for many people, this question was eliminated from the final draft.

Differences were calculated between scores on the constructs that had been repeated for reliability purposes and the original scores on those constructs. Differences were small, averaging 0.1 of a scale unit. Because these differences were well within the limits set by Osgood *et al.* (1971) for reliability, it was concluded that the modified format of the Semantic Differential achieved adequate test-retest reliability.

Two additional changes were made to the final questionnaire. Scales are often presented so that their polarities alternate or they are randomized to reduce the possibility of respondents placing all of their answers on one end of the scale. Comments from respondents completing the pretest, however, suggested that this arrangement was confusing and may have caused errors in responses. On the basis of these comments, all scales in the final questionnaire were arranged from negative (score of one), to positive (score of five). A study by Dickson and Albaum (1975) showed no significant differences in responses with or without randomization of polarities. Another advantage to arranging all scales from one to five was that coding was much easier and there were fewer chances for coding errors to occur (Dickson and Albaum, 1975). Changes were made to minimize biases that may occur due to the order of foods on the page and the order of constructs in the questionnaire. Both foods and constructs were presented to respondents in five randomized orders. The five different orders for foods were repeated throughout each questionnaire, the order of constructs was repeated in every fifth questionnaire.

## V. METHODOLOGY

### A. Method of Data Collection

The survey methodology selected for this study was cross-sectional in nature, in that data was collected only at one point in time (Babbie, 1973). A face-to-face interview technique of gathering data was used, because of its advantages over other methods, for example: higher response rates than mail surveys, the interviewer can clarify confusing questions for the respondent, observe the respondent to discover the degree of general interest, and, discover consumer issues related to the subject but not included in the questions (Babbie, 1973). All interviews followed a standardized schedule (questionnaire), so that all respondents were responding to similar stimuli (Smith, 1975).

### B. Sampling Design

The unit of analysis for this study was the household, and the general universe to which the data could theoretically be generalized was all households in Edmonton. The working universe was all households in Edmonton with a listed telephone number, and the sampling frame selected was the March, 1979, Edmonton Telephone Directory. Households were selected from the directory by simple random sampling, aided by a computer programme that generated random lines in the directory (Kinzel, 1979; Sudman, 1976). Businesses,

institutions and non-Edmonton households were omitted. Households were identified by address and telephone number, and were assigned an identification code.

As with any sampling frame, there are limitations to the use of a telephone directory: all households in the theoretical or general universe are not in the directory. Households may not be in the telephone directory for the following reasons:

i) households may not have a telephone. There is no valid way of determining the number of households that do not have phones; however, there is no reason to believe that this number is large (Crawford, 1980);

ii) households may have unlisted telephone numbers. Although there are no data readily available to indicate the proportion of households with silent numbers in Edmonton (Crawford, 1980), this proportion is estimated to be less than five percent of all households in most cities (Sudman, 1976);

iii) persons living in residences or dormatories are generally not represented in the telephone directory. According to the Statistics Canada definition of household, however, potential respondents omitted do not represent a significant number of households because these persons normally have another permanent residence;

iv) households occupying basement suites in private homes, where no second phone line has been installed, would not be represented in the directory. Once again, there are no statistics on the number of households in this category (Crawford, 1980). In this study, when the interviewer came to a private home having a basement suite, and it could not be determined which household had received the letter about the study, an eligible respondent from either household was interviewed. This procedure may actually decrease the bias produced by the omission of some basement-suite residences from the directory.

Besides the limitation that some households may be omitted from the directory, some households could be over-represented, for example, if they have more than one phone listing. This practice, however, is estimated to be rare in Edmonton, less than one percent of households (Crawford, 1980). Despite these limitations, the telephone directory has many practical advantages. The majority of households are represented, it is relatively up-to-date, it is readily accessible, inexpensive and easy to use (Kinzel, 1979).

C. Interviewing Procedures

After selecting 300 households from the sampling frame, each household's address was located on a map of Edmonton and the household's code number was placed on the map. Households were located and interviews carried out on a geographical cluster basis, with interviews being completed in one cluster before moving to the next. Approximately one week prior to interviewing, households in the area were sent an introductory letter explaining the nature of the study, who was conducting it, and describing the person in the household who was to be interviewed.

Interviews were completed by the author and one other interviewer. Prior to commencing the interviewing, the author and the interviewer discussed the questionnaire and standardized procedures, introductions and answers to anticipated questions. To maintain continued standardization of procedures, the interviewers met regularly during the interview period. The University of Alberta, Edmonton Area Study Interviewers Handbook (Population Laboratory, Department of Sociology, 1978) was used as the guideline for interviewing techniques and procedures.

Interviews were carried out during mornings, afternoons, and evenings on weekdays, and on Saturday afternoons. Every effort was made to interview the eligible respondent in each household. Before any household was recorded as a non-respondent (because they were not found at home) the household was visited once during the day, once

during the evening or on Saturday, and then telephoned during these times.

## D. Coding of Data

All data collected were transformed into numerical form and entered into a series of computer files. Foods, constructs and their scores were pre-coded in the questionniare. Socio-demographic data required classification. Some responses were pre-coded (such as education and income categories), however, other responses were grouped into similar categories and assigned a numerical code.

## E. Analysis of Data

### 1. Acceptability

To examine acceptability of each of the twenty-five foods co tained in the questionniare, a mean score on the construct "would not likely eat - would likely eat" was calculated using a SPSS Frequencies Subprogram (Nie *et al.*, 1975). The mean was selected as an appropriate measure of central tendency for scores on the bipolar constructs, because it is assumed that Semantic Differential data can be treated as interval level data (Osgood *et al.*, 1971).

### 2. Image Profiles

Mean scores were calculated for each of the other 16 scales using the same SPSS Frequencies Subprogram (Nie *et al.*, 1975). These scores, as well as the mean acceptability score, were plotted on graphs, to create an image profile or

visualization of respondents' opinions about each food. To explore further the concept of acceptability, the image profiles of each food were examined for both highly positive and highly negative scores. McFadyen (1972) called these "outstanding features" of the food (a negative outstanding feature being defined as a score less than 2, and a positive outstanding feature as a score greater than 4).

**3. Relative Importance of Each Factor to Acceptability**

A measure of association was calculated between the scores for all foods on the acceptability scale with the scores on each of the other scales. This measurement of association indicated which of the constructs might be the best predictors of acceptability. Pearson's correlation coefficient was selected as the appropriate measure of association and it was calculated using the SPSS Pearson Correlation Subprogram (Nie *et al.*, 1975).

**4. Patterns of Association Between Constructs**

Measures of association between the scores on all 17 constructs were also calculated using the SPSS Pearson Correlation Subprogram (Nie *et al.*, 1975). To explore further the patterns of association between these variables, a factor analysis technique was used (Kerlinger, 1967). The assumption behind factor analysis is that all of the 17 constructs would be actually measuring a smaller number of underlying, hypothetical factors, and that an examination of the patterns (clusters) of correlations in a correlation matrix could suggest the composition of those factors in

terms of the original 17 constructs (Brown and Fairbairn, 1975; Kerlinger, 1967; Nie *et al.*, 1975).

R-type factor analysis was selected for this study because the data were associations between variables measuring attributes or qualities of objects (Nie *et al.*, 1975). The factor analysis was carried out on the matrix of Pearon's correlation coefficients between the scores on each of the 17 constructs for all 25 foods with every other construct using the SPSS Factor Subprogram (Nie *et al.*, 1975). Initial factors were calculated using the principal-component technique, which consists of an exact mathematical calculation (Nie *et al.*, 1975). These factors are linear combinations of the original 17 constructs which account for the variability of scores in the data as a whole (Nie *et al.*, 1975). The first of these initial factors (or principal-components) is the "best linear combination" of the constructs (best in that it accounts for more variability in the data than any other combination). The second principal component is the linear combination of constructs that accounts for the maximum amount of variability that was left in the data after the first component was calculated, and so on.

The final step in the factor analysis of the data was the Varimax Rotation. This is a widely used method which is recommended for use when few assumptions are made about the data (Fewster *et al.*, 1973; Kerlinger, 1967; Nie *et al.*, 1975). Varimax Rotation means that the axes are kept at a 90

degree angle to each other as they are rotated (Nie *et al.*, 1975). The factor analysis solution consisted of factor loadings for each of the original 17 constructs on each of 5 new factors that were selected. By examining these loadings (which can be interpreted as measures of association between the constructs and the new factors), the researcher could assign each construct to one new factor (Brown and Fairbairn, 1975). A construct was assigned to the factor with which it seemed to be most highly associated (highly loaded on). Ideally, each construct is highly loaded on only one factor, and the assignment is not difficult. In reality, however, the assignment process is not this straightforward. Constructs may be loaded nearly equally on two factors, or not highly loaded on any.

**5. Single Socio-demographic Variables**

The SPSS Frequencies Subprogram (Nie *et al.*, 1975) was run on the socio-demographic data to produce distributions for each category, for each variable. Results were reported as percentage frequencies, unless otherwise stated. Based on the frequency distributions of the socio-demographic characteristics, some of the variables divided respondents into comparable groups, and comparisons of acceptability of foods were made between these groups; other groupings were too small to provide valid comparisons.

**6. Compound Socio-demographic Variables**

In addition to dividing respondents into groups based on suitable demographic factors, respondents were also

grouped according to two compound variables, the Blishen Index and Stage in Family Life Cycle.

a. Blishen Index

Blishen and McRoberts, (1976) calculated a numerical index for every occupation in the 1971 census list of occupations of the male labour force in Canada. This index is based on three components of each occupation: a prestige ranking, educational level, and income level. Households in this study were assigned a Blishen Index value, based on the occupational code for the spouse; this was done as the majority of the spouses were males.

b. Stage in Family Life Cycle

The second compound variable that was used in this study was Stage in Family Life Cycle. This variable is composed of age, marital status, and number and ages of children (Block and Roering, 1976; Cross *et al.*, 1975; Duvall, 1977; Schiffman and Kanuk, 1978). As described by Cross *et al.* (1975), differences in food selection practices and food habits are likely to occur between different family types for the following reasons "....(a) differences in dietary needs and preferences; (b) differences in the time and energy available for food shopping and preparation; and (c) differences in patterns of eating away from home...." (p. 131). Stage in Family Life Cycle has been found to influence various types of consumption behaviour and

has proven valuable to marketers (Cross *et al.*, 1975; Schiffman and Kanuk, 1978). The stages in the Family Life Cycle used in this study are illustrated below and are based on the stages described by Cross *et al.* (1975), Duvall (1977), and Schiffman and Kanuk, (1978).

| Stage | Description |
|---|---|
| 1 | Single, under 45 years of age, no children |
| 2 | Married, under 45 years of age, no children |
| 3 | Married, children under 6 years of age |
| 4 | Married, children 6 years of age or over |
| 5 | Married, 45 years of age or over, no children |
| 6 | Single, 45 years of age or over, no children |

**7. Socio-demographic Characteristics and Acceptability**

The socio-demographic characteristics judged suitable for further analysis are discussed in Chapter VI, Section B.2, and they are listed in Tables 12 and 13. To determine the effects of the socio-demographic variables on acceptability, the mean scores of each of the 25 foods on the construct "would not likely eat - would likely eat" were compared between the groups of respondents. This comparison was facilitated by the SPSS Subprogram Breakdown (Nie *et al.*, 1975). This subprogram includes a calculation of analysis of variance between mean scores of various groups of respondents. A difference between means was considered significant in this study if this difference reached the 5% significance level, based on the F-test (Nie *et al.*, 1975).

**8. Acceptability as a Predictor of Frequency of Consumption**

To determine the ability of the overall acceptability of a food to predict its frequency of consumption, mean acceptability scores were compared with median scores on the food frequency scale. Median scores were selected as a measure of central tendency for the food frequency scale because it was an ordinal measure (Nie *et al.*, 1975). A measure of association was then calculated between acceptability scores and frequency scores for all 25 foods. Kendall's *tau* was selected as a measure of assocation appropriate for ordinal variables (Nie *et al.*, 1975).

## VI. RESULTS

### A. Response Rate

A total of 173 households were visited and 113 questionnaires were completed, giving a 65 percent response rate. Of the 60 households that were non-respondents, 27 were refusals, and for 33 cases it was impossible to find anyone home, or no person in the household could speak English. If refusals alone were considered as non-respondents, the response rate was 84%. Analysis of refusals by address indicated that 15 of 27 (55%) were apartment-dwellers. It was also observed that 12 of the 27 (44%) were located in the central core of the city. A subjective comment from the interviewers was that more refusals came from households in locked apartment buildings, where the interviewers were forced to use an intercom system.

The households represented all areas of Edmonton, with the exception of the northwest. Although the original sample was well-distributed throughout the city, when the interviewing was stopped because funds were exhausted, this particular area of the city had not been visited to the same extent as other areas.

B. Socio-demographic Data

1. Description of the Sample

(a) Personal and Family Characteristics. Of the 113 respondents, 81% were female. The frequency distribution of respondents by age is given in Table 5. The age of respondents ranged from fifteen to eighty years. Three respondents refused to give their age. The largest group of respondents (62%) were between 21 and 40 years of age. The mean age of the respondents was 37 years.

The frequency distribution for household structure appears in Table 6. The category "couple with child or children" represented nearly half (46.9%) of the households. The next largest categories were "childless couple" and "singles". The mean household size was three persons, with a range from one to eight persons. The majority of households (83.2%) consisted of four persons or less. For the 61 households with children, the most frequent number of children was one (see Table 7). Two-thirds of respondents were married, and most families were relatively small.

(b) Socioeconomic Characteristics. Over half of the respondents (61%) reported having educational levels beyond high school: 36.3% of all respondents had either technical training or some university, 25.7% had a university degree. Those with only a high school education represented 16.8% of the respondents, 21.2% had some high school or less.

A summary of the respondents' work status appears in Table 8. Over half (54%) worked full or part-time. The next

Table 5. Age distribution of respondents in the research study

| Age (years) | Frequency number(percent) |
|---|---|
| 15-20 | 4 (3.6) |
| 21-30 | 41(37.3) |
| 31-40 | 27(24.6) |
| 41-50 | 20(18.1) |
| 51-60 | 9 (8.2) |
| 61+ | 9 (8.2) |

Table 6. Distribution of households in the research study according to family structure

| Category | Frequency number(percent) |
|---|---|
| Single | 19(16.8) |
| Room mates | 7 (6.2) |
| Siblings | 5 (4.4) |
| Couple, childless | 21(18.6) |
| Couple, child/children | 53(46.9) |
| Couple, children and other relatives | 2 (1.8) |
| Single parent | 5 (4.4) |
| Single parent and other person | 1 (0.9) |

Table 7. Number of children in the households surveyed

| Number of children[1] | Percent of families (with children) reporting specific number of children: This Study | Statistics Canada[2] |
|---|---|---|
| 1 | 39.3 | 33.1 |
| 2 | 29.5 | 36.1 |
| 3 | 18.0 | }26.9 |
| 4 | 6.6 | |
| 5 | 6.6 | 3.8 |

[1] "child" was defined as a person 21 years of age or less, living at home

[2] Statistics Canada defined "child" as a son or daughter, regardless of age, who has never been married and lives in their parent's home.

Table 8. Work status of respondents and spouses

| Employment Status | Number(percent) Respondent | Spouse[1] |
|---|---|---|
| Employed full-time | 51(45.1) | 67(90.5) |
| Employed half-time or less | 10(8.9) | 0(0.0) |
| Unemployed (seeking work) | 5(4.4) | 1(1.4) |
| Homemaker full time | 36(31.9) | 1(1.4) |
| Student, full-time | 6(5.3) | 0(0.0) |
| Retired | 5(4.4) | 5(6.8) |

[1] Number of respondents with spouses=74.

largest category was full-time homemaker; other categories contained relatively small numbers. Married respondents reported that their spouses were employed full-time in 90.5% of cases. Total family incomes are reported in Table 9. Over half of the respondents (58.4%), reported a yearly gross family income of $20,000 or more. Only seven (6.2%) of respondents refused to give income information.

(c) Characteristics Related to Ethnic Background. The sample was too small to include significant numbers of households representing any one ethnic background. Approximately one-fifth (20.4%) of respondents were born in Edmonton, and an additional 26.5% were born in other locations in Alberta. Another 33.6% were born in other provinces in Canada, the province with the largest number being Ontario with 11.5%, followed by Saskatchewan with 8.1%. A total of 80.5% of respondents were Canadian-born. Other birthplaces included 15 countries, with England being the only birthplace that accounted for over 5% of the respondents. Only 5.5% of respondents had lived in Canada for ten years or less.

Language spoken in the home can be related to ethnic background. In the great majority of households in this sample, English was the main language spoken (91.2%). In over half of the households (53.1%) no second language was spoken. A total of 13 second languages was reported, the most frequent being Ukrainian (12.4% of respondents), followed by French (8.8%).

Table 9. Family income reported by respondents in the research study

| Category | Frequency |
|---|---|
| | number(percent) |
| $2,000-11,999 | 17(15.0) |
| 12,000-19,999 | 23(20.4) |
| 20,000-29,999 | 35(31.0) |
| 30,000 & over | 31(27.4) |

Table 10. Formal courses in Food and Nutrition taken by respondents

| Course | Number(percent) of respondents |
|---|---|
| None | 59(52.2) |
| Junior or Senior High School Home Economics with food/ nutrition or food science component | 23(20.4) |
| Post-Secondary Level (non-Home Economics) | 12(10.6) |
| University Home Economics (non-Foods and Nutrition major) | 2(1.8) |
| Community School | 4(3.5) |
| Inservice | 3(2.7) |
| Weight Reduction Organizations | 6(5.3) |
| Patient Education | 1(0.9) |
| Other | 3(2.7). |

(d) Factors related to nutrition knowledge and to food restrictions. Table 10 summarizes food and nutrition courses that had been taken by respondents. Nearly half of the respondents had taken some type of nutrition course. Most respondents had taken such courses in junior or senior high school.

Respondents reported the following reasons for restricting food intake (as followed by the respondent or by another member of the household):

i) religious beliefs: 5.3% of respondents;

ii) health reasons: 53.1% of the respondents. A variety of responses was given to this question. These responses were coded into 8 categories. Some respondents gave answers that fitted into more than one category. The total number of times each category was mentioned is recorded in Table 11;

iii) special diet: 15% of respondents;

iv) weight control: 44.2% of respondents;

v) ecological or environmental reasons: 4.4% of the sample; and

vi) other reasons: 8% of respondents mentioned cost as a reason for food intake restriction.

Health reasons and reasons of weight control were the two explanations most frequently given for restrictions in food intake. However, 46.9% indicated that they did not restrict their intakes for any reason other than personal preference.

Table 11. Details of food restrictions for "health reasons"

| Reason | Frequency (no. of respondents citing each reason) |
|---|---|
| Allergies to special foods or types of foods | 11 |
| Try to select nutritious foods, healthy diet, and (or) try to follow Canada's Food Guide | 11 |
| Try to restrict certain types of nutrients, especially fats, sugars, salt, starch and/or carbohydrates | 22 |
| Try to restrict additives, chemicals, preservatives, colouring agents, and/or flavouring agents | 11 |
| Restrict junk food | 11 |
| Restrict a specific food or foods | 12 |
| Try to restrict prepared and/or packaged foods | 11 |
| Other restrictions, including snack foods and canned foods | 3 |

### 2. Characteristics Suitable for Further Analysis

An examination of the frequency distributions of the socio-demographic variables showed that some of these variables divided the respondents into groups suitable for comparison. These variables are listed in Table 12. The Blishen Index values for all working spouses are summarized in Table 13. To facilitate data analysis, the two highest and two lowest Blishen Index categories were combined, leaving four groups. Comparison of acceptability of foods between these socio-demographic groups will be reported later in this chapter.

## C. Acceptability of Selected Foods

The foods were ranked according to their mean acceptability score (see Table 14). Mean acceptability scores above 4 were defined as the Most Acceptable Foods, mean scores below 3 as the Least Acceptable Foods, and scores ranging between 3 and 4 as Moderately Acceptable.

### 1. Image Profiles of Selected Foods

The image profiles, representing the apparent meaning of each food to the respondents, were drawn using the mean score data for each of the 17 constructs. Each bipolar scale is expressed as a negative to positive scale (from 1 to 5) on the graph; mean scores are represented by * or o points for the mean on each construct. Figure 2 is a sample graph, or image profile, for whole wheat bread. The image profiles of all 25 foods are presented in Appendix B.

Table 12. Socio-demographic categories for possible further analysis of the data

| Variable | Groups |
|---|---|
| Age | <30 years (37.3%)<br>30-45 years (40.0%)<br>>45 years (22.7%) |
| Education of respondent | High School or less (38.1%)<br>Above High School (61.9%) |
| Work status of respondent[1] | Working or attending school outside the home, or seeking work (63.7%)<br>Full-time homemaker or retired (36.2%) |
| Family income | <$20,000 per year (35.4%)<br>$20,000 per year or more (58.0%) |
| Nutrition courses taken by respondent[2] | None (52.2%)<br>Junior or Senior High School (20.4%)<br>Other (27.4%) |
| Restrictions for Health Reasons | Restrictions (53.1%)<br>No restrictions (46.9%) |
| Restrictions for Weight Control | Restrictions (44.2%)<br>No Restrictions (55.8%) |

[1] Categories selected to represent those who may be at home a relatively large part of the time, and those who likely are not.

[2] Categories selected to compare data with those of Schwartz (1975) who found a foods and nutrition course in high school did not seem to influence nutrition knowledge and (or) practices.

Table 13. Blishen indices for spouses in the research study

| Blishen Index | Spouse' number (percent) |
|---|---|
| 70+ | 6 (8.9) |
| 60.00 - 69.99 | 17(25.4) |
| 50.00 - 59.99 | 15(22.4) |
| 40.00 - 49.99 | 14(20.9) |
| 30.00 - 39.99 | 9(13.4) |
| Below 30 | 6 (8.9) |

' There were 67 employed spouses

Table 14. Mean scores calculated for acceptability of selected foods

| 1. MOST ACCEPTABLE FOODS | Mean Score |
|---|---|
| Tossed salad | 4.6 |
| Orange juice | 4.6 |
| Cheddar cheese | 4.5 |
| Eggs | 4.5 |
| Roast beef | 4.5 |
| Fresh corn | 4.5 |
| Whole wheat bread | 4.4 |
| Turkey | 4.2 |
| Boiled potato | 4.2 |
| Baked fish | 4.1 |
| **2. MODERATELY ACCEPTABLE FOODS** | |
| 2% Milk | 3.9 |
| Ice cream | 3.8 |
| Frozen corn | 3.6 |
| Baked beans | 3.5 |
| Canned corn | 3.4 |
| Shredded wheat cereal | 3.4 |
| Chocolate cake | 3.3 |
| Yogurt | 3.3 |
| White bread | 3.1 |
| French fried potatoes | 3.1 |
| **3. LEAST ACCEPTABLE FOODS** | |
| Skim milk | 2.8 |
| Bologna | 2.7 |
| Pop (carbonated beverage) | 2.7 |
| Potato chips | 2.7 |
| Sweetened cereal(ready-to-eat) | 2.1 |

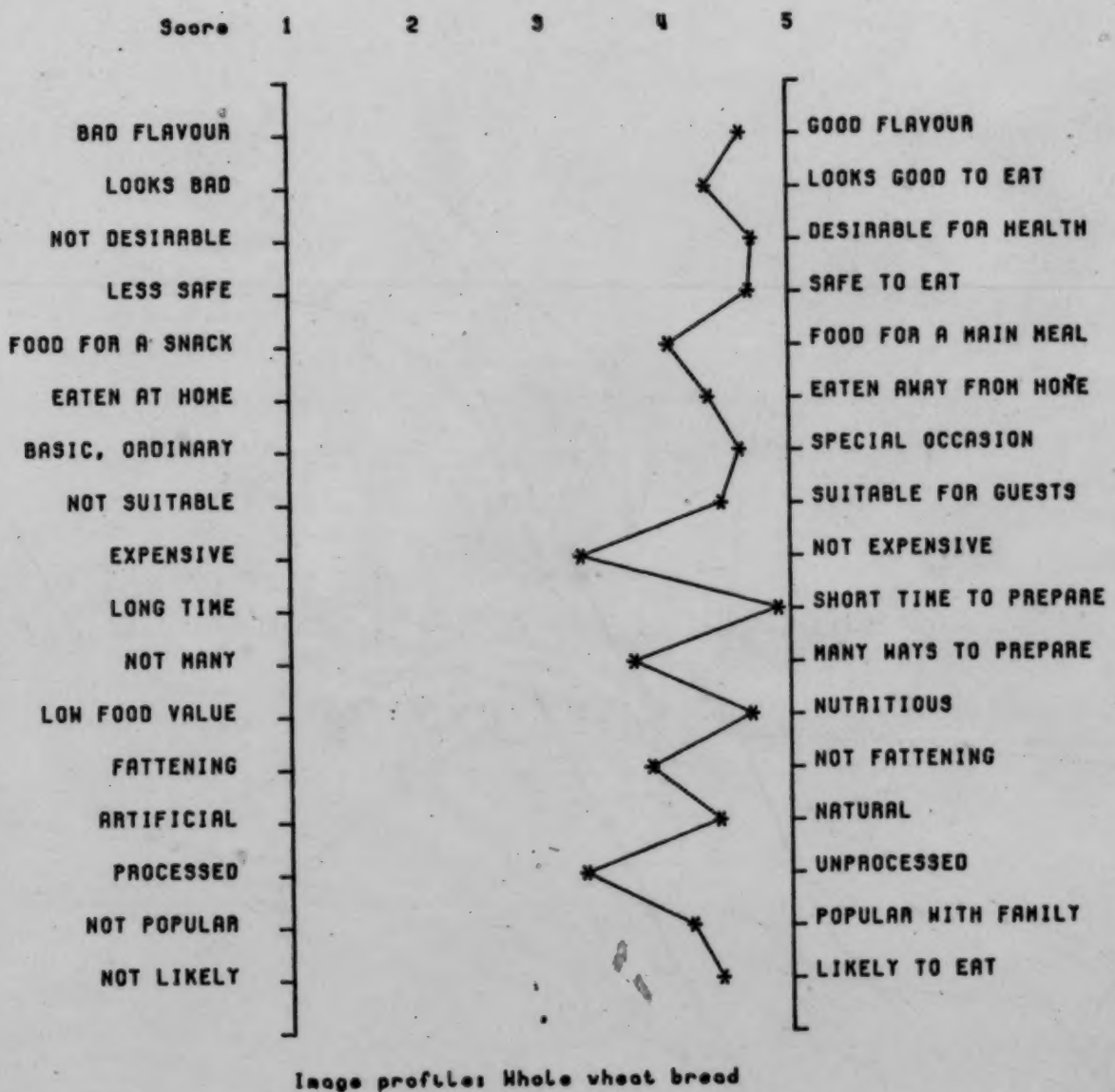



Figure 2. Diagrammatic representation of respondent attitudes to Whole Wheat Bread.

* represents the mean response score for each construct

It can be seen from Figure 2 that whole wheat bread is highly acceptable, based on the score of 4.4 for the construct "would not likely eat - would likely eat". This graph also illustrates that whole wheat bread was thought to have a very good flavour and quite a good appearance. It was definitely desirable in the diet for health, safe to eat, somewhat more suitable for a main meal than for a snack, was usually eaten in the home as opposed to away from home, was considered to be a basic, ordinary food, was quite suitable for guests, and was not particularly expensive. The respondents felt that whole wheat bread required only a short time to prepare, was somewhat versatile (i.e. it was closer to "many ways to use" than "not many ways to use"), was definitely nutritious, somewhat "non-fattening", quite natural, slightly unprocessed, and quite popular in the household.

Whole wheat bread received relatively high scores on most constructs, and scores close to neutral on others. However, this highly acceptable food received low scores on two constructs "generally eaten in the home - generally eat away from the home" and "basic ordinary - special occasion". Because several other foods received a similar judgement (i.e. positive or near positive for all scales but these two), perhaps the respondents felt that "generally eaten in the home", and "basic, ordinary food" were, in fact, positive characteristics of a food rather than negative ones (as was originally assumed by the researcher when polarities

were assigned). Based on this finding, the polarities of these constructs have been reversed in some of the subsequent analyses of this data.

**2. Outstanding Features**

When the image profiles of the ten Most Acceptable Foods (Table 14) were examined, it was found that in nearly every case, these ten foods had the same positive outstanding features, see Table 15a. These characteristics, are, in addition to "likely to eat":

a. has a good flavour
b. looks good to eat
c. desirable in the diet for health
d. safe to eat
e. generally eaten in the home
f. suitable for serving to guests
g. nutritious
h. natural
i. popular in the family

Referring only to these nine positive outstanding features of acceptability, Table 15b shows that these features are present in the ten Moderately Acceptable Foods in only 10% - 50% of cases. These outstanding features are only present in the five Least Acceptable Foods in 0 to 10% of the cases (Table 15c). These results show that the nine characteristics are essential aspects of a highly acceptable food.

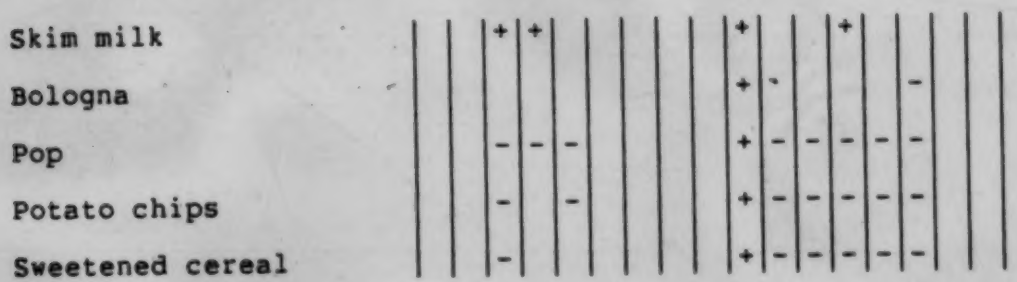
Table 15. Positive and negative outstanding characteristics of selected foods

| Food | Construct' A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) Most Acceptable Foods | | | | | | | | | | | | | | | | | |
| Tossed salad | + | + | + | + | + | + | + | + | | + | | + | + | + | + | + | + |
| Orange juice | + | + | + | + | | + | + | + | | + | | + | + | + | | + | + |
| Cheddar cheese | + | + | + | + | | + | + | + | | + | + | + | | + | | + | + |
| Eggs | + | + | + | + | + | + | + | + | | + | + | + | + | + | + | + | + |
| Roast beef | + | + | + | + | + | + | | + | - | - | + | + | | + | | + | + |
| Fresh corn | + | + | + | + | + | + | | + | | | | + | | + | + | + | + |
| Whole wheat bread | + | + | + | + | | + | + | + | | + | | + | | + | | + | + |
| Turkey | + | + | + | + | + | + | | + | | - | + | + | + | + | + | + | + |
| Boiled potatoes | + | | | + | + | + | + | + | + | | | + | | + | + | + | + |
| Baked fish | + | + | + | + | + | + | | + | | | | + | + | + | + | | + |
| (b) Moderately Acceptable Foods | | | | | | | | | | | | | | | | | |
| 2% Milk | + | + | + | + | | + | + | + | | + | + | + | + | + | | + | |
| Ice cream | + | + | | | | | | + | | + | | | - | | | | |
| Frozen corn | | | | + | + | | | | | | | | | + | | | |
| Baked beans | | | | + | + | | + | | | | | | | | | | |
| Canned corn | | | | | + | | | | | + | | | | | | | |
| Shredded wheat | | | | + | + | + | + | | | + | | | | | | | |
| Chocolate cake | + | + | - | | | | | + | | | - | - | - | | | | |
| Yogurt | | | + | + | | | | | | + | | + | + | | | | |
| White bread | | | | | | | | | | + | | | | | | - | |
| French fried potatoes | | | - | | | | | | | | - | | - | | | | |

Construct'

|A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|

(c) Least Acceptable Foods




' + "positive" outstanding feature
- "negative" outstanding feature

Constructs denoted by "positive" poles:

A - has a good flavour;
B - looks good to eat;
C - desirable in diet for health;
D - safe to eat;
E - suitable for a main meal;
F - generally eaten at home*;
G - basic, ordinary*;
H - suitable for serving to guests;
I - not expensive;
J - requires short time to prepare;
K - many ways to prepare;
L - nutritious;
M - not fattening;
N - natural;
O - unprocessed;
P - popular in household;
Q - likely to eat

* scale polarities reversed from original form, because of survey results

D. Ranking the Components of Acceptability

Correlation coefficients for all 17 constructs with the acceptability construct were calculated, and are given in Table 16. The polarities of the scales are arranged in Table 16 so that all correlation coefficients are positive. This necessitated reversing the original polarities of the constructs "eaten at home - eaten away from home" and "basic, ordinary - special occasion" as has already been mentioned, and the construct "not a food a person can serve if short of time - a food a person can serve if short of time".

E. Results of Factor Analysis

The factor analysis solution for these data indicated that 67% of the variance could be explained by five new factors. Only these five factors were considered significant because additional factors explained less than 5% of the variance in the data. The five new factors in this study and the constructs associated with them appear in Table 17. The factor loadings, or correlations between factors and constructs, for each of the five factors in the present study were such that each construct loaded higher on one factor than on any of the others by an amount of at least 0.11. In this way, assignment of constructs to factors was relatively straightforward. However, three of the seventeen constructs (i.e. "suitable for a snack - suitable for a main meal", "processed - unprocessed" and "not many ways to prepare - many ways to prepare") loaded quite highly on other factors

Table 16. Correlation coefficients (r) for each construct with acceptability

| CONSTRUCT | r, (P=.01) |
|---|---|
| Not suitable/suitable for guests | +.57 |
| Not popular/popular with family | +.56 |
| Has a bad flavour/has a good flavour | +.53 |
| Low food value/nutritious | +.45 |
| Less safe to eat/safe to eat | +.43 |
| Not desirable/desirable in diet for health | +.42 |
| Artificial/Natural | +.42 |
| Looks bad to eat/looks good to eat | +.41 |
| Generally eaten away from home/at home | +.37 |
| Special occasion food/basic, ordinary food | +.32 |
| Processed/unprocessed | +.32 |
| Not many/many ways to use | +.30 |
| Fattening/not fattening | +.26 |
| Suitable for a snack/main meal | +.24 |
| Expensive/not expensive | +.07 |
| A food a person can/can not serve if short of time | +.05 |

Table 17. New factors suggested by factor analysis

| Factor | Percent[1] | Constructs Associated with Factor[2] | Factor Loading[3] |
|---|---|---|---|
| 1 | 39.0 | not desirable/desirable in the diet for health | +.82 |
| | | fattening/not fattening | +.79 |
| | | low food value/nutritious | +.77 |
| | | less safe/safe to eat | +.73 |
| | | artificial/natural | +.66 |
| | | not many/many ways to use[4] | +.60 |
| 2 | 10.0 | has a bad flavour/good flavour | +.79 |
| | | not suitable/suitable for guests | +.75 |
| | | looks bad/looks good to eat | +.71 |
| | | not likely/likely to eat | +.71 |
| | | not popular/popular in the household | +.69 |
| 3 | 8.0 | special occasion/basic, ordinary | +.76 |
| | | generally eaten away from home/at home | +.76 |
| 4 | 5.3 | requires a short time/long time to prepare | +.85 |
| | | processed/unprocessed[4] | +.53 |
| | | suitable for a snack/main meal[4] | +.52 |
| 5 | 5.3 | expensive/not expensive | +.92 |

[1] Variability in data explained by each factor.

[2] A construct is considered to be highly associated with a factor if the factor loading is >0.6.

[3] Can be interpreted as a measure of association between the constructs and the factors.

[4] Although the factor loading of this construct is below the >.60 cut-off point, it is more highly associated with this factor than with any other factor.

as well; that is, they were not as simple in structure or meaning (Nie *et al.*, 1975). Because the factor loadings of these "more complex" constructs were ≤0.6, and because the resulting groups of constructs were meaningful, this value was selected as the arbitrary cut-off point for factor loadings; a construct with a loading of >0.6 on any factor was said to be "highly associated with" that factor (Brown and Fairbairn, 1975).

F. Effects of Socio-Demographic Characteristics on Acceptability

Table 12 (page 58) lists the socio-demographic variables that divided respondents into groups suitable for comparison. Mean acceptability scores for each food were compared between groups. None of the differences between the mean acceptability scores reached the 5% level of significance for the variables: age of respondent, food and (or) nutrition courses taken by the respondent, and restrictions for reasons of weight control. Although the acceptability of one food differed significantly between different Blishen Index values, the differences did not follow any trend, and were judged not to be of any practical significance.

Both educational level of the respondent and household income, components of socioeconomic status, significantly influenced the apparent acceptability of some foods. The acceptability of whole wheat bread increased while that of

white bread and bologna decreased as level of education increased. As household income increased, the acceptability of both sweetened cereal and frozen corn decreased. Respondents who did not work outside of the home judged bologna to be more acceptable than respondents who were employed.

The variable "restricts food intake for health reasons" had a greater influence on food acceptability, in terms of numbers of foods showing a significant difference in acceptability, than any other variable. The acceptability scores for white bread, ice cream, shredded wheat, baked fish, turkey, roast beef, french fried potatoes, canned corn and chocolate cake were all significantly lower for those respondents who claimed to restrict food intake for health reasons.

Stage in Family Life Cycle influenced acceptability of three foods. The acceptability of tossed salad was significantly less for Stage 6 (older, single adults) than any other stage. Acceptability of sweetened cereal was lowest in Stages 3 and 4 (families with children) than in other stages. Finally, the acceptability of frozen corn was highest in Stages 1 and 5, lowest in Stage 2, and moderate in Stages 3, 4 and 6.

Table 18. Mean acceptability score and median food use frequency

| Food | Acceptability | Food Frequency |
|---|---|---|
| tossed salad | 4.6 | 6.2 |
| orange juice | 4.6 | 6.6 |
| cheddar cheese | 4.5 | 6.0 |
| eggs | 4.5 | 6.0 |
| roast beef | 4.5 | 4.6 |
| fresh corn | 4.5 | 3.5 |
| whole wheat bread | 4.4 | 6.4 |
| turkey | 4.2 | 3.3 |
| boiled potato | 4.2 | 5.7 |
| baked fish | 4.1 | 4.0 |
| 2% milk | 3.9 | 6.7 |
| ice cream | 3.8 | 4.8 |
| frozen corn | 3.6 | 3.4 |
| baked beans | 3.5 | 3.6 |
| canned corn | 3.4 | 3.7 |
| shredded wheat | 3.4 | 3.6 |
| chocolate cake | 3.3 | 3.2 |
| yogurt | 3.3 | 3.7 |
| white bread | 3.1 | 5.2 |
| french fries | 3.1 | 3.7 |
| skim milk | 2.8 | 2.5 |
| bologna | 2.7 | 3.1 |
| pop | 2.7 | 3.9 |
| potato chips | 2.7 | 3.3 |
| sweetened cereal | 2.1 | 2.5 |

## G. Acceptability Compared with Frequency of Consumption

If acceptability is a measure of the likelihood of selecting a food, then it should be a good predictor of the frequency with which a food is eaten. Table 18 summarizes both the mean acceptability scores and the median food consumption frequency score for each of the 25 foods. In general, the food frequency decreases as acceptability decreases. There are notable exceptions to this trend, however, as in the case of roast beef, fresh corn, turkey, baked fish, 2% milk, white bread, ice cream and pop.

To investigate further the use of acceptability as a predictor of frequency of consumption, an appropriate measure of association, Kendall's *tau*, was calculated between these two variables for all 25 foods. The overall value of *tau* between these two measures was +0.43, representing a moderately strong measure of association. Kendall's *tau* values between food use frequency and all constructs were also calculated to determine if any other construct was a better predictor of consumption than acceptability. The measure of association between the construct "not popular/popular in the family" was +0.51, suggesting that this construct was the best predictor of consumption of all constructs in the study.

## VII. DISCUSSION

### A. Sample Characteristics

An analysis of the personal and family characteristics of the respondents showed that in most households, a female made the majority of decisions about food, supporting the well-accepted assumption that the wife/mother of the household is the decision-maker or "gate-keeper" regarding foods available in the home (Anderson *et al.*, 1977, Canada, 1979a).

Family incomes in this study were relatively high, an observation that might be explained by the high proportion of households with both the respondent and the spouse in the labour force. Although respondents came from different regions of Canada, their numbers from the different regions were not large enough to make comparisons on this basis. The study of the influence of region or ethnic background on food habits would require either a much larger sample or a different type of sampling design. However, a sufficient number of respondents reported that food intake was restricted because of someone in their household, citing health or weight control as the most common reasons, that comparisons could be made on this basis.

The socio-demographic variables enabled the characteristics of the research sample to be compared with other demographic data for Edmonton residents. The distribution of several variables was compared with statistics from the most

recent census for Edmonton (Statistics Canada, 1978). When the three categories of the family structure variable which contain couples were combined (see Table 6, p. 51), couples represented 67.3% of the respondents. This was almost identical to the 1976 census data for Edmonton, which indicated that 67.4% of households were families (the definition of families corresponding to the definition of "couple" in this study). The mean household size in this study was also in agreement with the census data. According to Statistics Canada, 51.9% of females over 15 years of age were in the labour force, 54% of respondents in this study (mostly females) were in the labour force (see Table 8, p. 52). An examination of characteristics related to socioeconomic level showed that the distribution of respondents in this study was skewed toward higher educational levels, when compared to the census data.

The research sample was also compared with other statistics about the population in Edmonton. This was conducted by the Forecasts and Methods Department of Edmonton Telephones, based on the actual distribution of telephone exchanges for each area of the city, and using statistics kept by Edmonton Telephones.' The distribution of ages of this group of respondents was skewed toward the younger age groups, indicating that this was a relatively young sample of respondents.

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' The author wishes to express appreciation to Mr. A. Crawford for his assistance in this analysis.

In terms of family structure, household size, and percentage of females in the labour force, the study sample was quite representative of Edmonton households. The major differences between the study sample and census data were the age and educational level of the respondents. It was concluded that generalizations can be made from these data about Edmonton households, bearing in mind the differences in age and education level between the research sample and other demographic data available, and the following limitations of the sampling procedure:

1. the omission of one section of the city;
2. the fact that not all households in Edmonton are listed in the sampling frame; and,
3. the fact that there is no way of determining whether the socio-demographic characteristics of the non-respondents were significantly different from those of the respondents.

## B. Components of Overall Acceptability

This research study had five objectives, the first of these was to determine which of the constructs studied were strongly associated with acceptability, measured by the mean score on the construct "would not/would likely eat".

The following nine characteristics seemed to be necessary attributes of a food for it to be judged highly acceptable by the respondents:

1. suitable for serving to guests
2. popular in the family

3. has a good flavour
4. nutritious
5. safe to eat
6. desirable in the diet for health
7. natural
8. looks good to eat
9. generally eaten in the home

The factor most strongly correlated with acceptability was suitability for guests (r=0.57). This confirmed the observation by McFadyen *et al.* (1973) in a consumer study of meats. This factor has not been revealed by "direct" studies, indicating that respondents are less consciously aware of this influence on their acceptance of foods. This factor has been described by other authors as "hospitality" and as "prestige" (see Appendix A). Results of this study confirmed that opinions of other people are an important influence on food acceptance and selection.

Almost as powerful a predictor of acceptability of a food was popularity with the family (r=0.56). This factor has been shown to be important by researchers using both direct and indirect approaches to studying factors influencing food selection. This aspect of acceptability would probably be of particular concern to the respondents in this study, because of their roles as decision-makers regarding foods for the households. This supported the fact that likes and dislikes of other family or household members, especially husbands (Cosper and Wakefield, 1975)

have been identified as important considerations in food acceptance.

In addition, the flavour construct was quite strongly associated with acceptability (r=0.53). This has been found to be an important factor in food selection in many studies using various approaches. The fact that respondents find flavourful foods highly acceptable supports the obvious assumption that people will not eat foods that they do not find tasty, no matter how nutritious, available or low priced. However, the nutritious, safety and health aspects of foods were considered to be moderately good predictors of acceptability (r=0.45, 0.43 and 0.42, respectively). The aspects of nutritional value and healthfulness of foods have been found by previous researchers to be important factors in food selection. This suggests that these factors are pertinent to acceptance and selection of foods, and that these aspects deserve the attention of nutrition educators, so that they can provide consumers with answers about healthfulness and safety of foods.

Acceptability was correlated (r=0.42) with the construct "artificial/natural". This supported the observation by Martin (1976) that respondents believed that natural was a positive characteristic of a food, whereas artificial was a negative characteristic. Natural might be related to healthfulness in the minds of some consumers. This connotation of natural has been created by food faddists, "health food" stores and popular magazines. The construct

"artificial-natural" was more strongly associated with the nutritious and safety constructs than with the construct "processed-unprocessed", emphasizing that the term "natural" seemed to refer more to the wholesomeness or healthful aspects of a food than to the amount of processing or refining involved.

The image profiles of the 25 foods also gave an insight into the way in which respondents interpreted "natural". Respondents rated yogurt as more "natural" than ice cream, whole wheat bread as more "natural" than white bread, and boiled potatoes as more "natural" than french fried potatoes which, in turn, were more "natural" than potato chips. The same pattern of responses was also found for the "low food value/nutritious" construct. Respondents in this study perceived the "natural" attribute of a food as indicating its safety and nutritive value, and "artificial" as lack of safety and low food value. Such generalizations could cause misconceptions in the minds of consumers, and nutrition educators should address such issues, provide proper definitions for terms like nutritious, and try to give realistic prespectives to such terms.

The appearance construct "looks bad/looks good to eat" was also moderately correlated with acceptability ($r=0.41$). This was not surprising because visual appeal of a food has long been recognized as an important aspect of sensory evaluation. Although flavour aspects of a food were more highly correlated with acceptability than appearance, it is

obvious that foods must meet appropriate appearance criteria in order to be accepted in the diet. Hence, foods that have an unacceptable appearance are not likely to be chosen because they are nutritious.

Scores on the constructs "a food generally eaten away from home/at home" and "special occasion/basic, ordinary" yielded somewhat surprising results. The author expected that the characteristics "eaten at home" and "basic, ordinary" would be "negative" or at least "less favourable" aspects of food acceptance, but they were judged by the respondents as being "positive" aspects of the foods. The original assumption by the author was based on the expectation that "a food generally eaten away from home", and "special occasion food" would be positive, because of the association with prestigious aspects of going out to eat for entertainment or celebration. The more acceptable foods in this study were the ordinary foods often consumed at home, or, conversely, the ordinary foods often consumed at home became the acceptable foods. These constructs may have been measuring the idea of familiarity, a concept that was suggested by several authors as being an important factor in food selection (see Appendix A).

These two constructs might, in fact, be better indicators of familiarity than the construct "not/very familiar with". This construct was included in the pretest, but was not used in the study, because it had an unsatisfactory distribution of scores. Although the

characteristics of prestige, popularity, aesthetics and healthfulness of a food were found to be more important to acceptability, these results showed that an acceptable food is one with which the respondents are familiar. This supported the fact that food habits are difficult to change and poses an additional challenge to nutrition educators.

The construct "processed-unprocessed" was not stongly correlated with acceptability ($r=0.32$). It was not clear from this study how respondents interpreted this attribute of a food. This construct was significantly associated with "artificial-natural", but the latter construct had an additional "wholesomeness" meaning as previously discussed. Both the interviewer and the author received many questions about this construct from respondents. It is possible that its meaning for consumers has changed since 1976 when Martin reported it in her Repertory Grid study.

The versatility aspect of a food was a relatively poor predictor of acceptability ($r=0.3$). While respondents considered versatility of preparation a positive quality of a food, this characteristic was not particularly important to acceptability.

The construct "fattening/not fattening" ($r=0.26$) was poorly correlated with acceptability. Respondents perceived "fattening" as a negative attribute of a food, however, many other factors in this study had a much greater effect on acceptability. This was surprising in view of the stated emphasis on weight control for many of the households

included in this study, and the current emphasis on weight control in our society. Although many consumers stated that they wanted to reduce weight, it appeared that other factors besides caloric content were guiding their food choices. The respondents in this study indicated by their responses that they were more likely to eat foods that are popular with family and friends, than foods that are not fattening. These findings might be important in explaining difficulties with programmes designed to achieve weight control by altering food habits.

The original polarity of the construct "food for a snack/main meal" was assigned by the author based on the assumption that consumers think that snack foods are low in food value. This assumption was supported by the findings that pop, potato chips and chocolate cake were judged by the respondents as low in food value, and as being suitable for a snack. Although this construct was not highly correlated with acceptability ($r=0.24$), respondents perceived snack foods to be undesirable in the diet. Consumers might need to be educated about snack foods, in particular, types and preparation of nutritious snack foods. There is considerable evidence in the literature that eating snack foods has become an important aspect of our food habits (Canada, 1973b; Lachance, 1978), increasing the need for consumer information and education on snack foods.

Two constructs having very weak associations with acceptability were the expense and time of preparation

constructs (r=0.07 and 0.05, respectively). This was surprising since these two aspects of foods are thought to be very important to consumers. Not only was the time aspect weakly correlated with acceptability, the polarities originally assigned had to be reversed; it seemed that "a short time required for preparation" was not necessarily a positive feature in a food. Perhaps food prices and time required for preparation are issues that have become acceptable or perhaps fashionable "concerns" about foods, while others (for example, prestigious value of foods) are issues about which consumers are less conscious. It is possible that, similar to the concern for weight control, consumers often state that they want to select foods of a lower price, however, other factors influence their actual selection. It is also possible that the wordings of the constructs themselves influenced responses, and that other constructs are needed to tap concern for food prices and for food preparation time.

C. Underlying Factors Revealed by Factor Analysis

The second research question proposed in this study: to determine associations between factors found to influence food selection, was achieved by the factor analysis of the data (see Table 17, p. 68). Factor analysis indicated that the 17 original factors were really measuring only five distinct concepts. Constructs that were highly associated with any one factor, that is, had a factor loading of >0.6,

were assumed to be measuring the same concept. Therefore, if further studies were undertaken, the number of variables could be reduced without sacrificing information about food attitudes.

Factor 1 seemed to be measuring a general "good for you" concept: not fattening, nutritious, safe, and natural were components of this concept. Although the versatility construct was loaded higher on this factor than on any of the others, it was below the assigned 0.6 cut-off point. It would be difficult to suggest how the versatility construct could be thought of as part of a health factor. The components of the health factor, however, should be valuable for the design of health and nutrition education programmes.

Factor 2 seemed to be measuring a concept that was summarized as "I like it, and they like it". The two sensory qualities of food, appearance and flavour, were components of this factor, as were aspects of popularity in the family, suitability for guests, and likelihood of eating the food. Respondents in this study perceived that a food that they would accept, should be tasty and attractive, and liked by other people as well.

Factor 3 measured a "familiarity" characteristic of foods. The importance of this characteristic has already been discussed. Factor 4 was clearly measuring a concept of "time required for preparation". The constructs "processed-unprocessed" and "suitable for a snack-suitable for a main meal" were more strongly associated with factor 4 than with

any other factor. It is possible that respondents attached a "time of preparation" meaning to these constructs; for example, "unprocessed" foods (such as, raw vegetables, uncooked cereals, uncooked meats) may be considered more suitable for a main meal because they require a longer cooking time. These results indicated that respondents were not attaching a meaning of healthfulness or safety to the term unprocessed, and vice versa.

Factor 5 measured the concept of cost. This study indicated that none of the other constructs studied were closely related to the cost concept. Arranging the 17 original constructs under five underlying concepts, as determined by factor analysis, suggested ways in which respondents defined the factors that were shown to influence food acceptance and selection. These definitions might be valuable to nutrition educators by providing information about consumers and their decision making process for food consumption.

**D. Influence of Socio-demographic Characteristics on Acceptability of Selected Foods**

The third research question posed by this study was to determine whether or not acceptability of foods varied between groups of respondents, for whom different demographic characteristics had been identified.

Age of respondents, foods and (or) nutrition courses taken by respondents, Blishen Index values and restrictions

on food intake because of weight control did not affect the acceptability of foods, according to the responses to questions in this study. The findings regarding age of respondent did not support the majority of studies in the literature which suggest that age influences food-related attitudes and practices. It is possible that the age distribution of respondents in this study was not great enough to show differences reported by other workers.

The finding regarding the effect of foods and (or) nutrition courses supported the work of Schwartz (1975), who found that a high school Home Economics foods and nutrition course did not influence nutrition knowledge, attitudes or reported practices. It is possible that such courses do not have a long term impact in determining food preferences. Perhaps nutrition education is required at other stages in life (such as, elementary school, prena al classes) to have more effect.

The finding that restrictions for weight control had no apparent effect on the acceptability of the 25 foods was surprising, especially since many of the foods were selected for their high caloric content, as well as differences in caloric content. As discussed earlier, it is possible that the influence of weight control on the various foods selected is not apparent in this study because actual food selection is guided by other factors.

The demographic variables, educational level, household income, work status of respondent, and Stage in Family Life

Cycle influenced acceptability of only a small number of foods (maximum of three foods per variable). While these influences might be interesting if only one food or food type was being studied, it cannot be concluded from this study that these variables had an important overall influence on the acceptability of a variety of foods. It is possible that either the small sample size or some other characteristic of the sample caused these variables not to have an apparent influence on food acceptance.

The variable exerting more influence than any other on acceptance of foods was restrictions for health reasons. This was shown to influence the acceptability of 9 foods in this study. Some of the foods that were less acceptable to those who restrict foods for health reasons might be explained by health concerns that have been expressed by consumers: ice cream, roast beef, french fried potatoes and chocolate cake might be restricted because of their caloric or fat content. White bread and canned corn might be restricted because of concern for the degree of processing of these foods. However, why shredded wheat, baked fish and turkey were reported as being less acceptable to respondents who restrict food intake for health reasons could not be determined from this study and might warrant investigation.

A large number of demographic variables was included in this study because there was no indication in the literature of their relative importance to food preferences. This study indicated that the only demographic variable that could be

shown to have a significant influence on food acceptability was restriction on food intake for health reasons.

**E. Ability of Overall Acceptability of Foods to Predict Frequency of Consumption**

The fourth objective established for this study was to determine whether the measure of acceptability predicted the frequency of consumption of a food. In general, acceptability did predict food use frequency (see Table 18, p. 72), in which it may be seen that the more acceptable foods had the higher food frequency scores. Exceptions to this could be explained to some extent by examining the characteristics assigned to the foods (see image profiles, Appendix B). Examining first, the ten foods with the highest acceptability scores (Table 18, p. 72), six of these foods were consumed at least once per week. Roast beef was consumed slightly less often than once per week. There were two outstanding negative features of roast beef, it is expensive, and it requires a long time to prepare. These negative outstanding features might explain why roast beef did not achieve as high a food consumption frequency as might be expected from its acceptability score.

Fresh corn was consumed less than once a month, this could be explained by its seasonal availability. Turkey was also consumed less than once a month, yet its only outstanding negative feature was the length of time necessary for its preparation. However, the consumption of

turkey has traditionally been associated with specific seasons and festive occasions, and this probably continues to account for its low use frequency, despite its good acceptability. Baked fish also achieved a poor frequency of use score compared to its acceptability score. However, this result could be explained by the low score on the construct "not popular/popular in the household". This might also be attributable to fish not being a popular meal for the Canadian prairie areas, an obsevation made in several Statistics Canada reports and by McFadyen (1973). There was no real indication why respondents in this study rated fish as not popular. It received relatively high scores on other important constructs such as taste, appearance and nutritional value. These data emphasized the importance of the family preferences in food acceptance and consumption.

In contrast, the data in Table 18 (p. 72) showed that of the ten moderately acceptable foods, and the five least acceptable foods, 2% milk, ice cream, white bread, bologna, pop and potato chips achieved higher use frequencies than might be expected. The only positive outstanding feature for white bread, bologna, pop and potato chips that could explain their relatively high use frequency was their convenience, all requiring a short time to prepare. It is also possible that although respondents use these foods, they believe that these ítems "should not be" acceptable on the basis of nutritional value, and that this belief biased their responses on the scale "likely to eat". Ice cream and

2% milk have several important positive outstanding features (flavour, appearance and suitability for guests) which could explain their relatively high use frequency.

Although acceptability was shown to be a moderately good predictor of frequency of use (*tau* = 0.43), popularity in the household was an even better predictor (*tau* = 0.51). This finding further indicated the importance of other family members in the food selection process. The data showed that the food preferences of other members of the household exerted a greater influence on foods consumed than the respondents' own preferences. This might mean that the emphasis, in terms of nutrition education, would have limitations if it was focused on the "gate-keeper"; the gate-keeper might become convinced that skim milk should be served more often in the household, only to find that other members will not accept it. Nutrition educators might have to find ways of influencing all members of the family, not only the gate-keeper, of the value of various changes in food related behaviour.

## F. Meanings Associated with Selected Foods

The final objective of this study was to determine meanings that respondents attached to the selected foods. Meanings of foods have been expressed in the form of "food image profiles" which were produced from the mean scores of all 17 constructs for each food. The image profiles are shown in Appendix B. Image profiles can be used to determine

consumer perceptions of specific foods. With this knowledge, educators could design programmes to correct misconceptions, and to change perceptions to achieve greater acceptance of a specific food. Some examples, based on current nutrition education concerns and the comparisons of image profiles obtained in this study, will be considered. Constructs in these image profiles have been rearranged so that easy reference to the five underlying factors identified by the factor analysis could be more readily observed and discussed.

Because both turkey and baked fish had high acceptability scores, it should be possible to promote either of these as low fat alternatives to a meat such as roast beef. Although turkey was rated slightly less popular than roast beef (see Figure 3), probably its major difference from roast beef was its use for special occasions. Greater use of turkey would require promotion and marketing of this meat as a "basic, ordinary food". In contrast, baked fish differed from roast beef in its "I like it - they like it" characteristics (see Figure 4), indicating that far more basic concepts of baked fish must be changed in order to increase its acceptability and hence its consumption. Baked beans would be even more difficult to promote as a replacement for meat, because their acceptability score was very much lower, and they received low ratings on several important constructs: appearance, healthfulness, suitability for guests and popularity in the family.

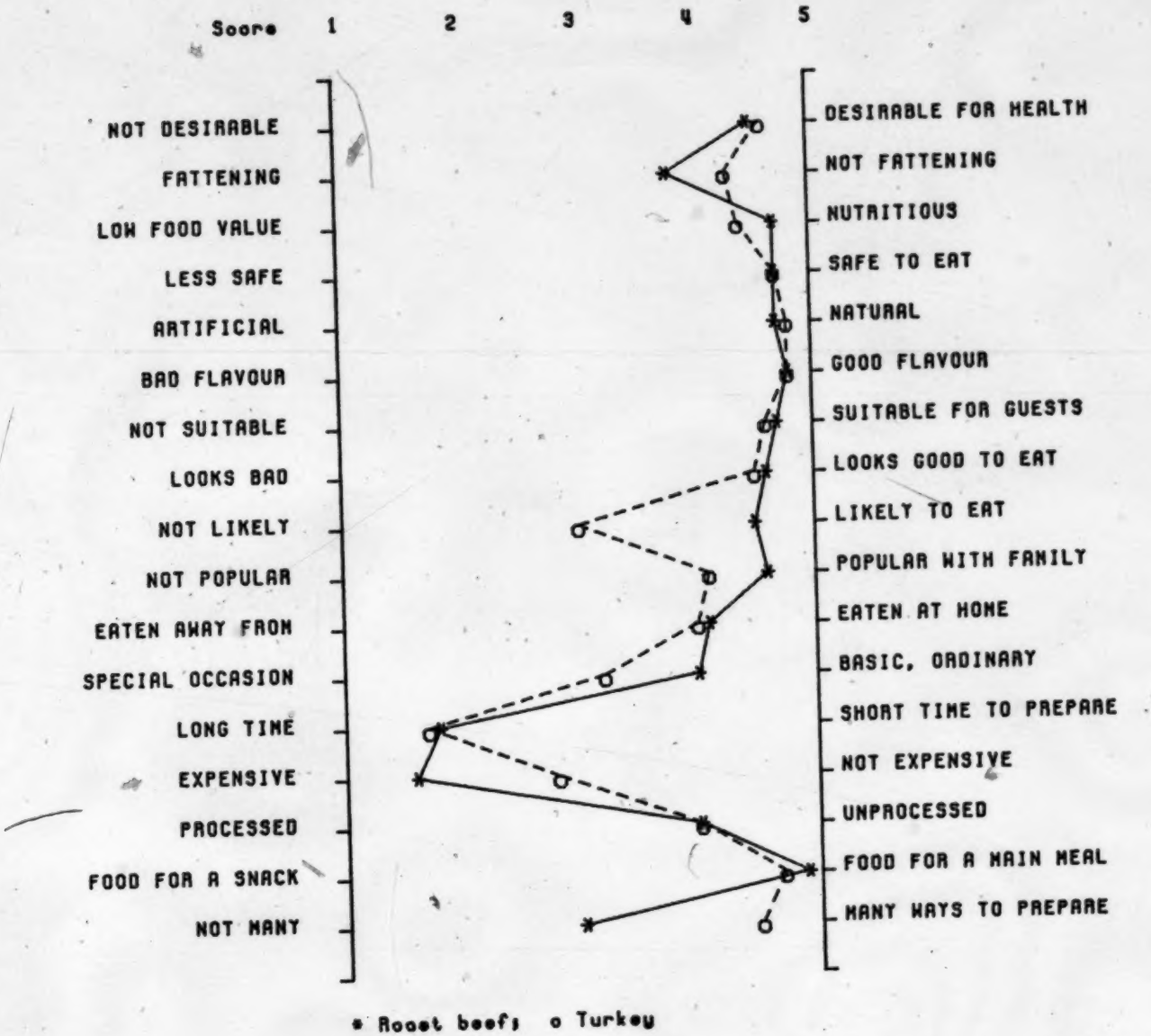


Figure 3. Comparison of image profiles for roast beef and turkey.

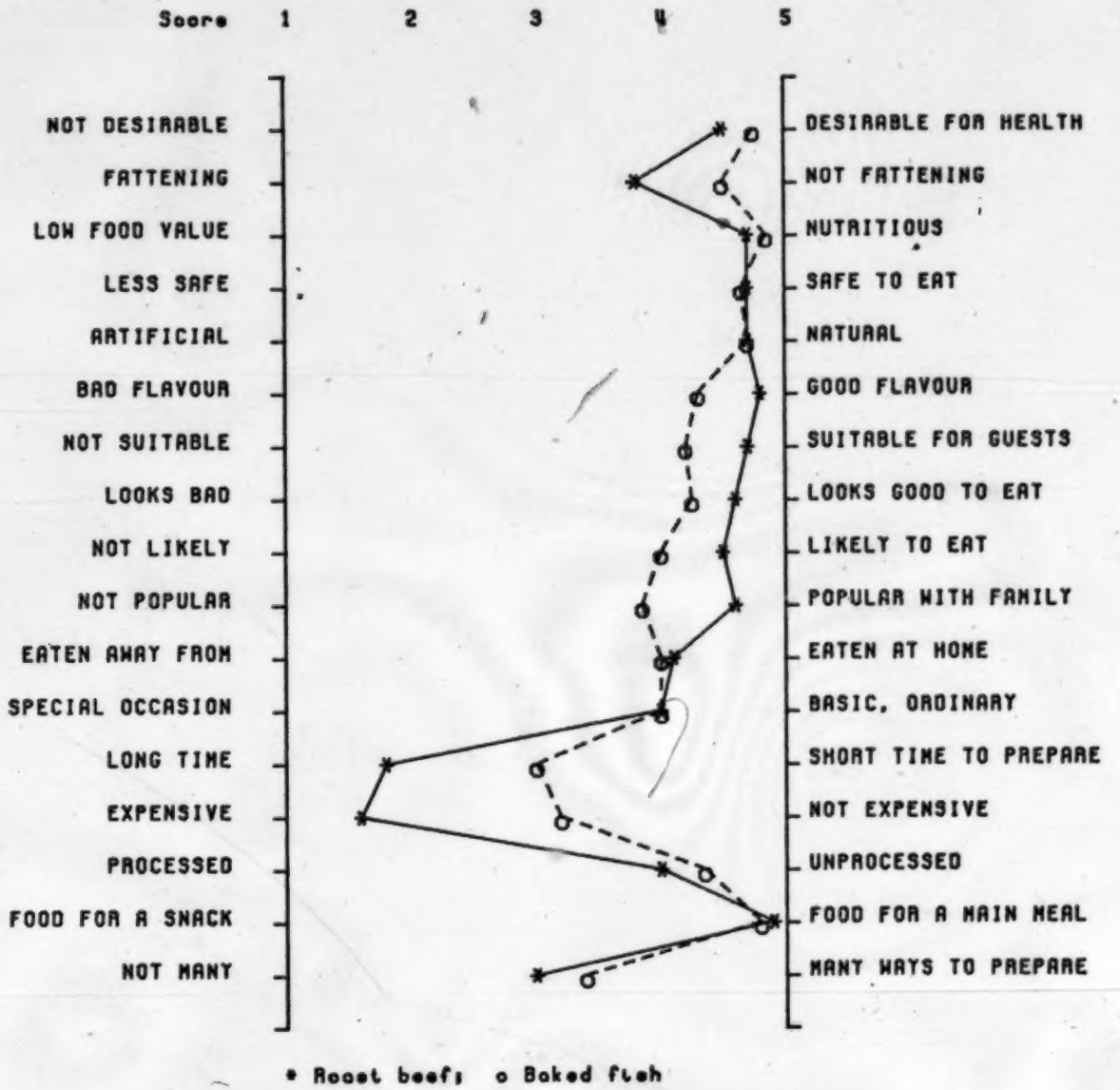


Figure 4. Comparison of image profiles for roast beef and baked fish.

Comparisons between possible substitute foods: ice cream and yogurt (Figure 5) and skim milk and 2% milk (Figure 6) yielded interesting information about these foods. Based on the scores on the construct "not likely/likely to eat", yogurt might be considered a realistic substitute for ice cream. Although the "healthful" image of yogurt is much better than that of ice cream, the "I like it - they like it" characteristics were quite markedly in favour of accepting ice cream. It may therefore be interpreted that replacement of ice cream in the diet by yogurt might not be readily achieved. Similarly, it would be difficult to promote skim milk as an alternative for 2% milk. Nutrition educators should be cognizant of such differences in consumer attitudes to foods when attempting voluntary or required changes in food acceptance.

The differences in consumer perceptions of white and whole wheat breads are shown in Figure 7. There are few, if any, characteristics of whole wheat bread measured in this study, that would make it unacceptable to consumers. In contrast, white bread was ranked as an inferior food product, for both its "healthfulness" and "I like it - they like it" charactistics, and in addition, it was perceived as being highly processed.

"Processing" was not a clearly understood concept to respondents, yet there was a marked difference in mean scores for this construct for the two types of bread included in the study. Similarly, for cereals (Figure 8),

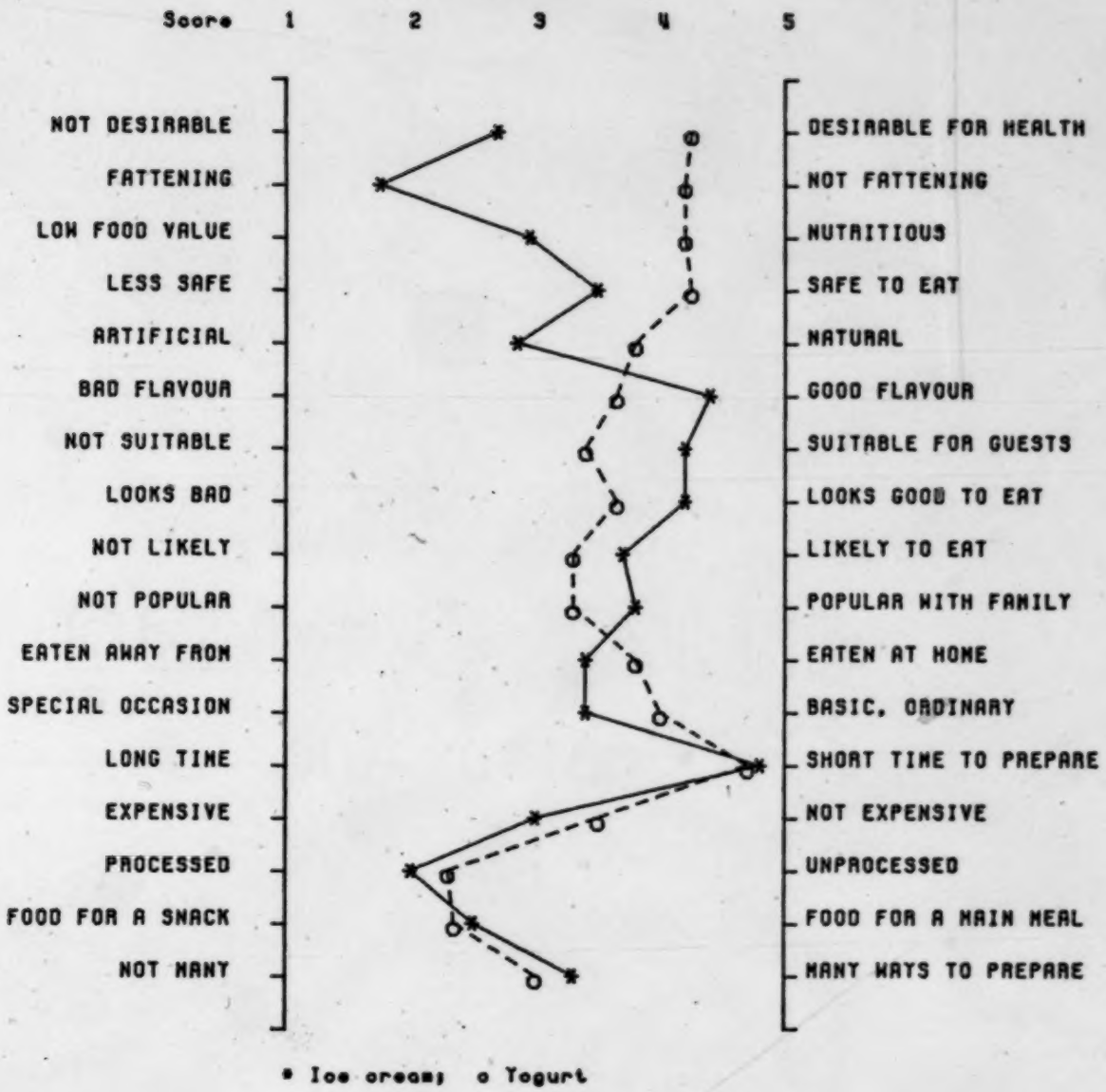


Figure 5. Comparison of image profiles for ice cream and yogurt.

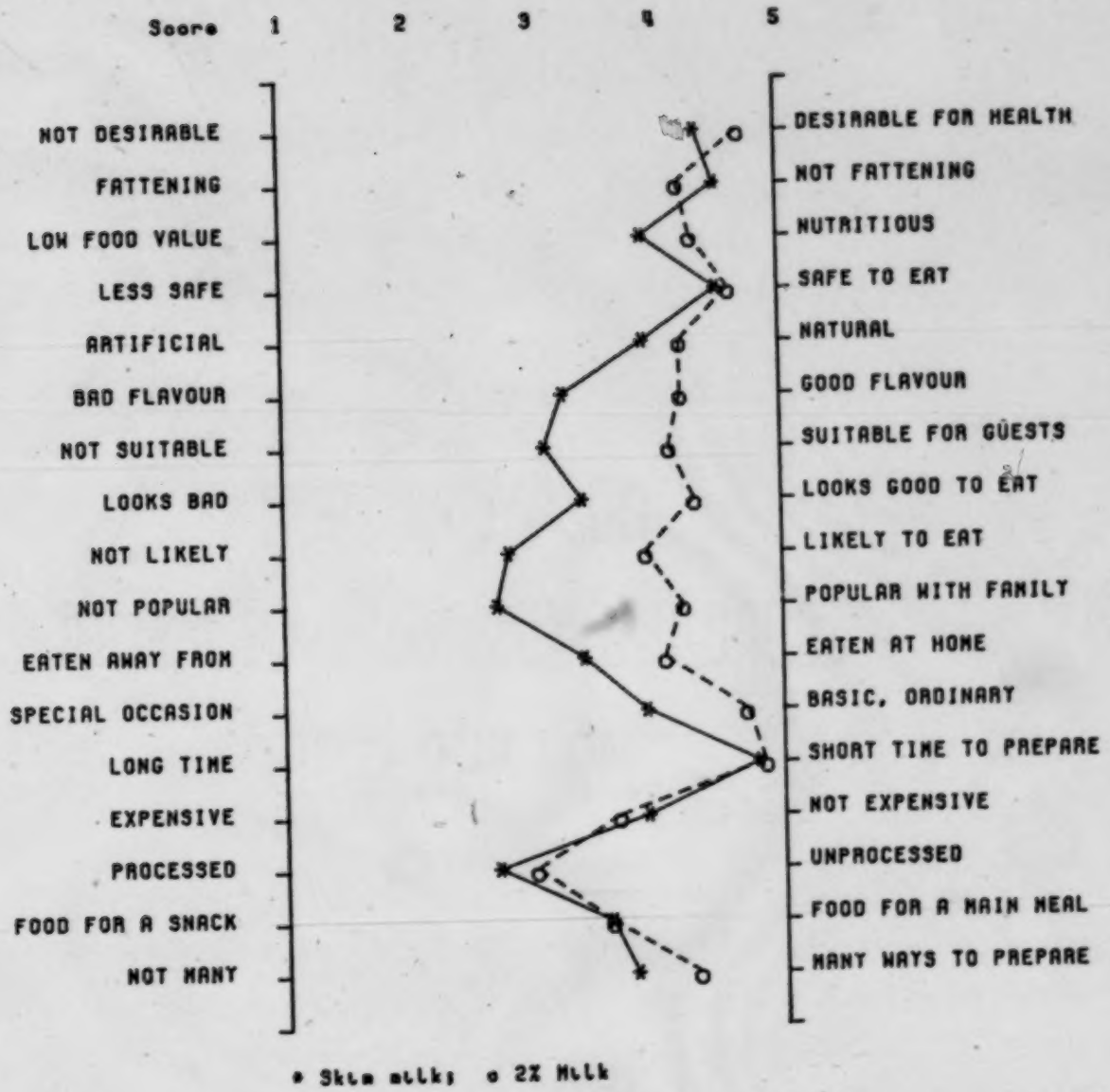


Figure 6. Comparison of image profiles for skim milk and 2% milk.

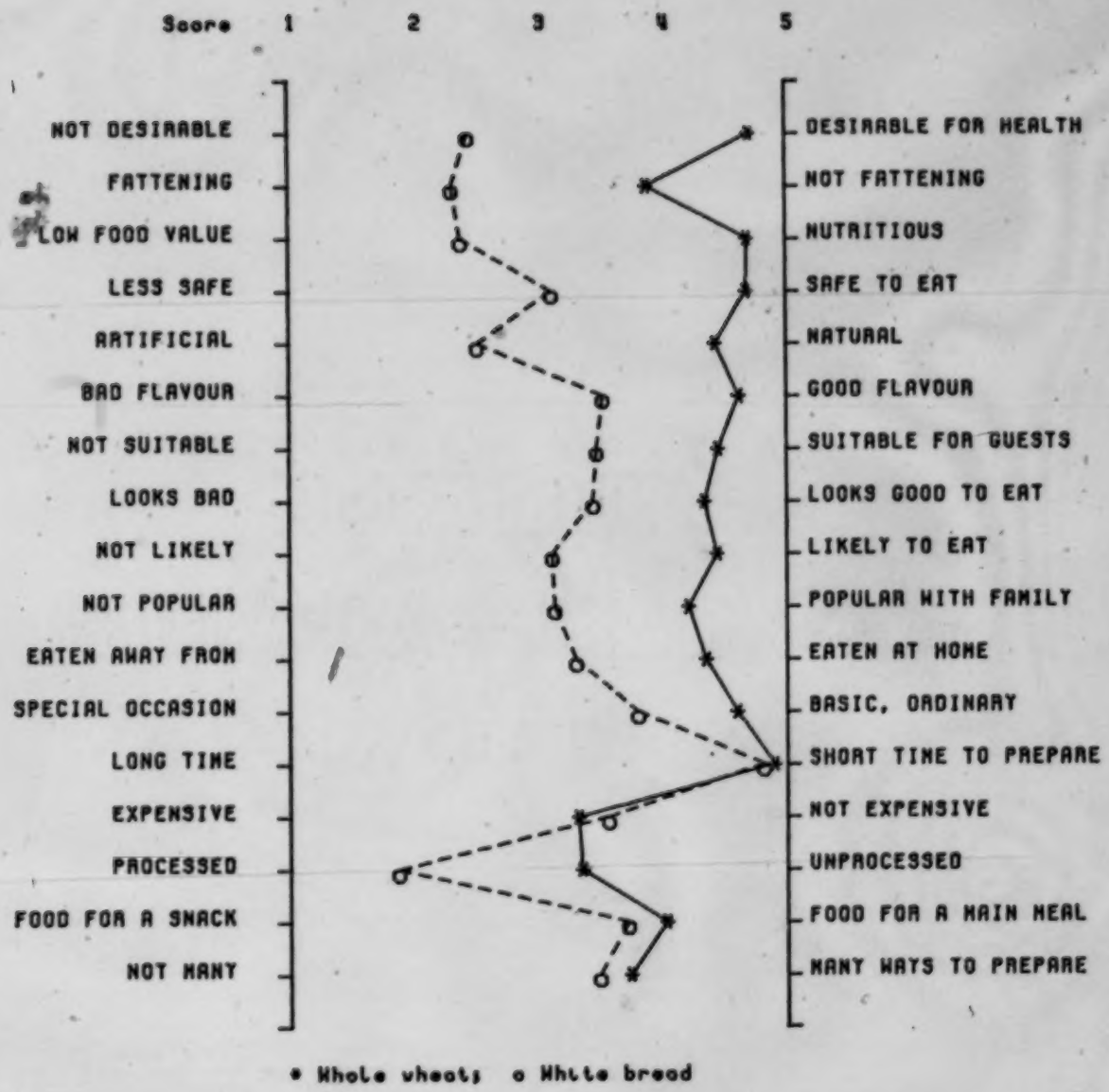


Figure 7. Comparison of image profiles for whole wheat and white breads.

the sweetened cereal was ranked less acceptable than shredded wheat, and for the processing construct, sweetened cereal was perceived as being more "processed" than shredded wheat, Other foods that allowed the "processing" construct to be studied were the three corn products (Figures 9 and 10). Although the frozen and canned corn were not ranked as highly processed foods, their mean scores on the processing construct were markedly less than the score for fresh corn. The mean scores for fresh corn (on all constructs except "fattening") indicated greater acceptance of this food than its processed counterparts. The factor analysis did not associate processing with "healthfulness" characteristics of foods, but it certainly appeared that for foods where different levels of processing could be studied, the healthful and acceptance scores were lower with greater actual and perceived degrees of processing.

Consumer concern for cholesterol was not indicated by the acceptability score for eggs, however, a profound concern was expressed for a meat product such as bologna, with an extremely low mean acceptability score, as well as low scores on several other constructs. The image profiles of pop, potato chips and sweetened cereals indicated that it should be easy to discourage the the use of these foods through appropriate nutrition education programmes. Similarly, it should be easy to promote boiled potatoes as a substitute for french fried potatoes (Figure 11). However, these observations might also illustrate a limitation of

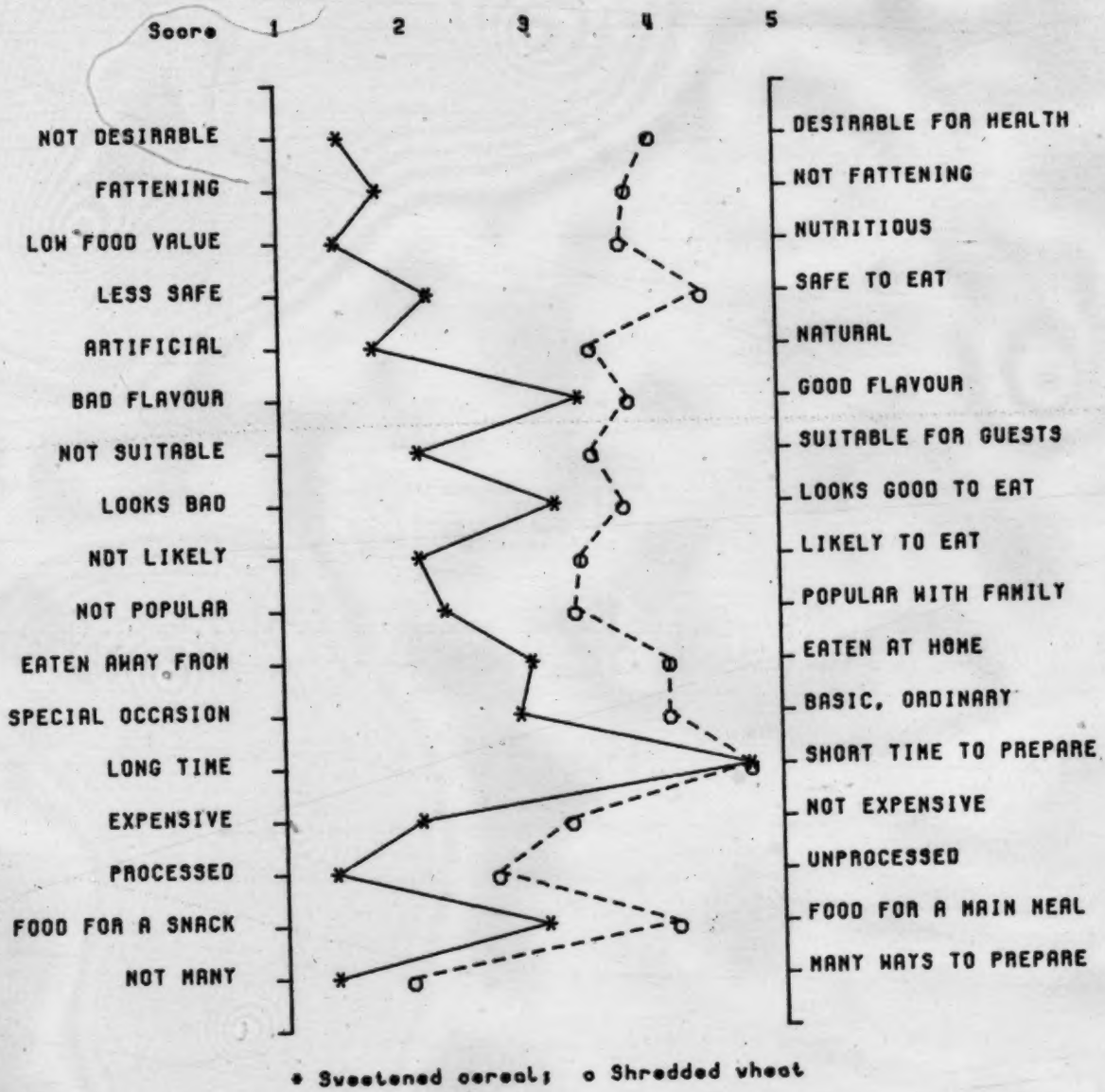


Figure 8. Comparison of image profiles for sweetened cereal and shredded wheat cereal.

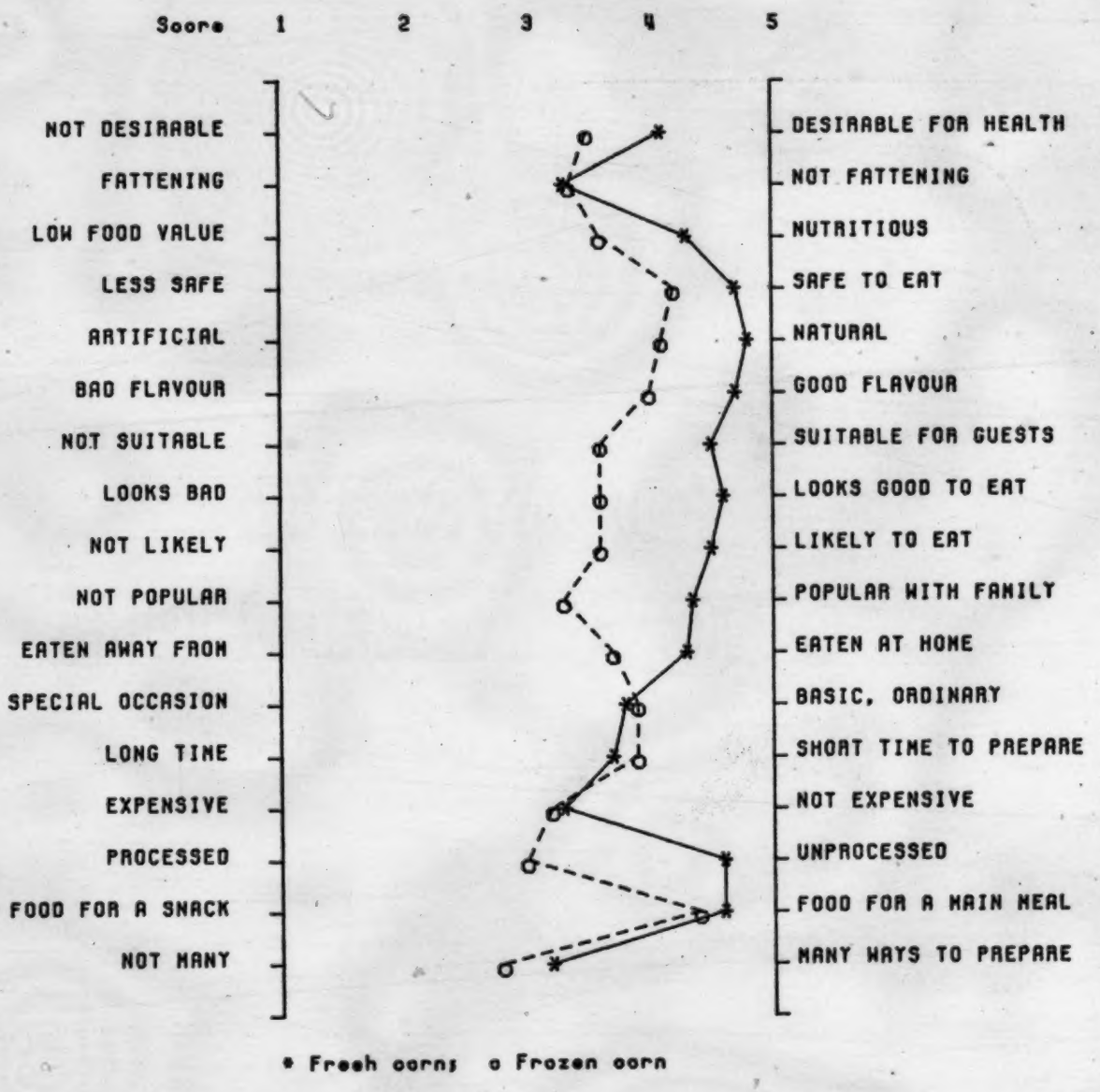


Figure 9. Comparison of image profiles for fresh and frozen corn.

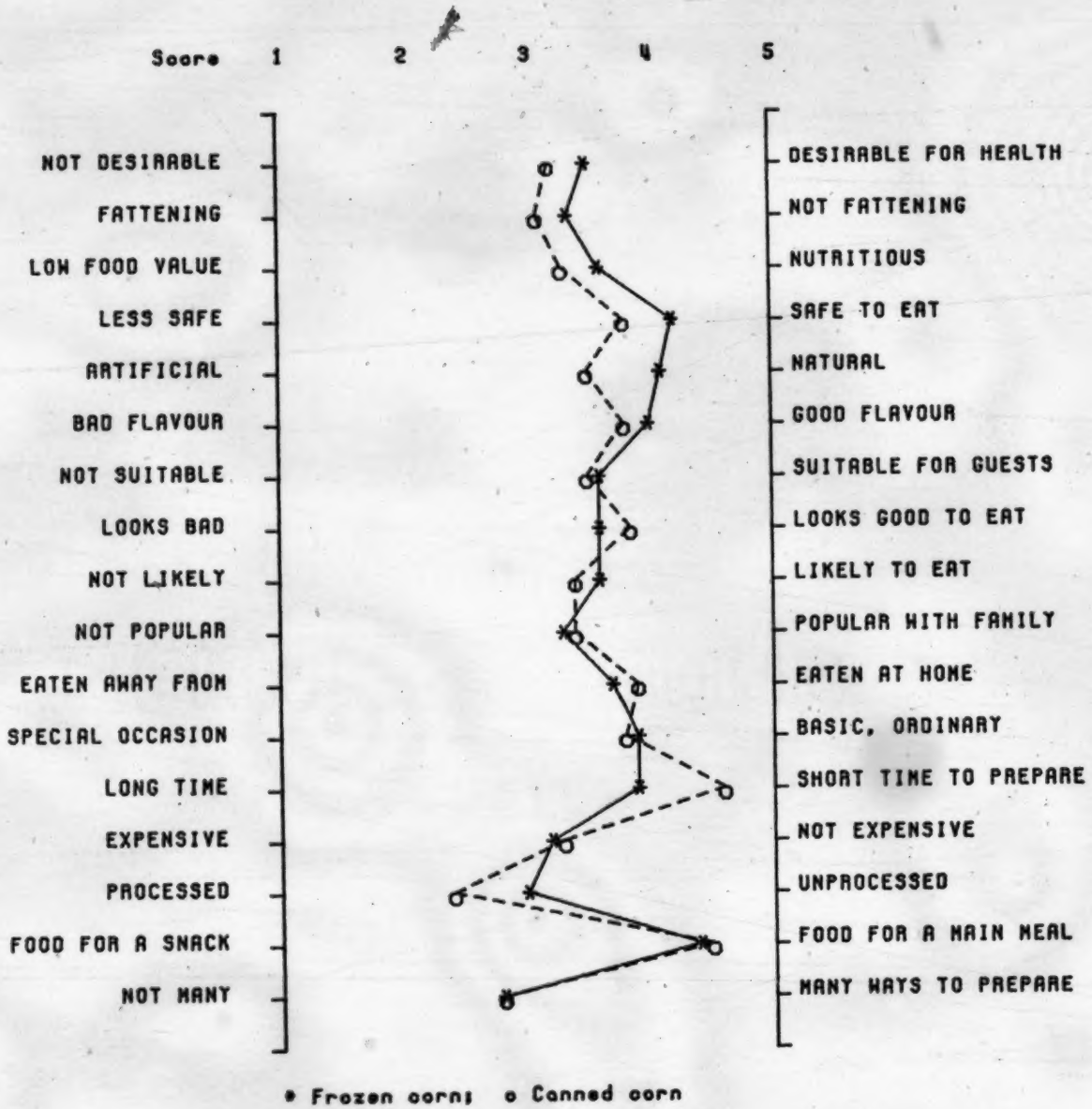


Figure 10. Comparison of image profiles for frozen and canned corn.

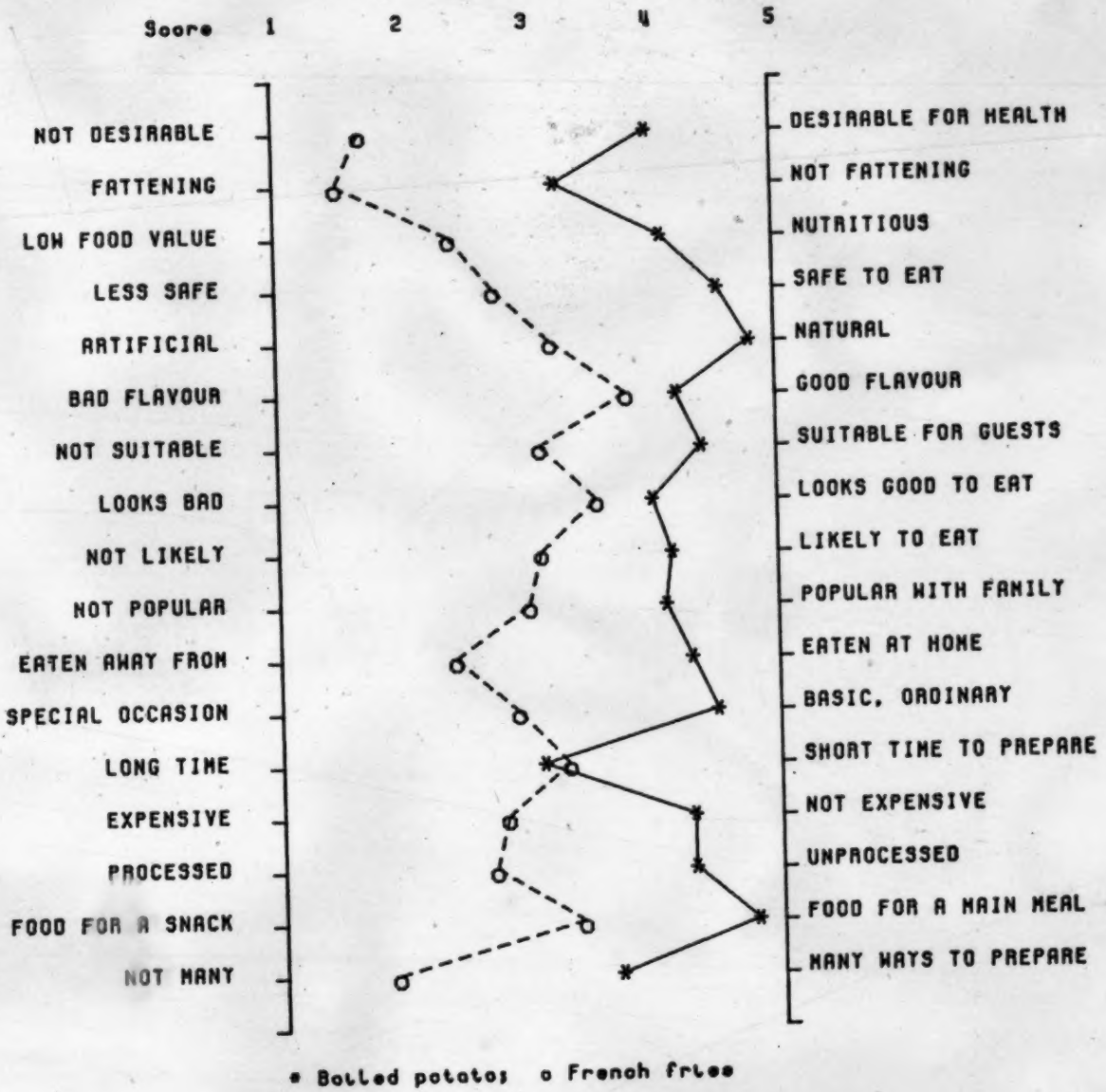


Figure 11. Comparison of image profiles for boiled and french fried potatoes.

this type of study, in that respondents might feel that these foods should not be acceptable, and might have given biased responses for them in this study. Assuming this to be the case, however, means that consumers were aware of the nutritional deficiencies of these foods, and might simply require appropriate substitutes or added motivation to reduce their use frequency.

The meanings of foods as displayed by the image profiles raised many questions about the ways in which consumers perceive foods. Further study of these perceptions would be justified for a better understanding of many foods and nutrition issues.

## VIII. SUMMARY AND CONCLUSIONS

Current knowledge of food related behaviour is generally insufficient for designing education programmes that can be expected to bring about behaviour changes. More information about consumer needs, wants and perceptions are required, especially from the consumer standpoint, and this study was designed to contributute toward this information need. The Food Behaviour System model proposed by Anderson *et al.* (1977) was used as the theoretical framework for the study, and the overall objective was to determine factors influencing food preferences for a selected group of foods, and to explore interrelationships that exist between these factors.

The data from this study contributed to the understanding of the model (refer to Figure 1, p. 4). The external variables, friends and family (measured in this study by the suitability for guests and popularity in the family constructs, respectively), were found to be the most powerful predictors of acceptability. Acceptability correlated quite highly with reported food consumption (a food related behaviour) and it was assumed to be a measure of potential consumption.

One of the internal variables in the model, sensory perception, was also found to be quite highly correlated with acceptability. Sensory perception was measured by consumer responses to the flavour and appearance constructs. Certain knowledge held about foods, specifically

desirability in the diet for health, its safety, nutritional value and the degree to which it was judged to be "natural" were also good predictors of acceptability.

One other construct, generally eaten at home, was also an important predictor of acceptability. This construct could be measuring an internal variable such as socio-cultural or psychological need, or it could be a measure of availability, an external variable. More research is required to clarify the meaning of this construct to consumers.

At least two external variables from the model, economics (cost) and educational programmes, were found to have little influence on acceptability. The only demographic variable found to influence acceptability in this study was restrictions on food intake for health reasons. This is an internal variable that represents individual values or beliefs about foods. More research is needed to study ways in which consumers who restricted food intake for health reasons differed from those who did not. Several other beliefs about foods, for example, whether they were basic, ordinary foods or whether they were suited to special occasions, more suitable for a main meal or a snack, time required to prepare a food, and its versatility were found to be poorly correlated with acceptability.

Factor analysis of the data showed that the original 17 constructs were really only measuring five underlying concepts. The components of these five new factors suggested

how the respondents in this study were processing (interpreting) the various internal and external variables, and therefore contributes additional information to the food behaviour model. The first of these five new factors, "good for you", explained almost 40 percent of the variability in the data, indicating that this concept (made up of the constructs: desirable in the diet for health, not fattening, nutritious, safe and natural) was an important concept used by consumers in evaluating foods and deciding their acceptability.

The results of this study have practical application to educators and food marketers who are attempting to promote specific foods. For a food to be highly acceptable, it should possess the components of acceptability, namely: suitability for guests, popular in family, have a good flavour, be nutritious, safe and desirable in the diet for health, be natural, look good to eat, and be generally eaten in the home (as opposed to being eaten away from home). The cost of the food and its convenience (in terms of cooking time) were not found to be important components of acceptability.

Food image profiles were drawn as visual representations of the apparent meanings of the specific foods to the respondents, and also to provide practical information for those wishing to promote such foods. By comparing image profiles, it was possible to predict the likelihood of a consumer selecting one food in preference to

another, especially where the foods represented likely or potential substitutes for one another. Furthermore, the image profiles indicated consumer perceptions that must be changed to achieve desired substitutions, for example, in a nutrition programme.

The construct correlating most strongly with acceptability was suitability for serving to guests, a factor that was discovered originally, only by an indirect approach to determining motives for food selection. This reinforces the need for indirect methods in studies of this nature.

Data collection could be reduced in future studies by taking into account the results of the factor analysis carried out in this study. Theoretically, only one or two constructs from the underlying factors need to be used in further studies covering these aspects of food acceptance. However, further research is needed to obtain a fuller understanding of the complexities of food related behaviour. Future studies should use a model, such as Anderson's Food Behaviour Systems model (1977), as a theoretical framework, so that information gathered about food behaviour can be integrated and organized on a meaningful basis. An on-going challenge for research of this nature will be the problem of out-guessing the respondent, so that responses given to questions reflect, more assuredly, the respondent's attitudes and not those that the respondent feels the researcher wants to hear, or that they consider to be "correct" or "right" in response to the questions in the survey.

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## X. APPENDIX A

### Factors Influencing Food Selection

Terms and Constructs Used to Express Factors

This appendix contains fourteen topic categories and within each category are two types of factors, those expressed as bipolar constructs, and those expressed as single adjectives or phrases. Of the sixteen studies referenced below [3], four were clearly designed to elicit factors from consumers as opposed to presenting factors to consumers for evaluation; these include: McFadyen *et al.*, 1973; Green, 1975; Martin, 1976; and, Rhee and Stubbs, 1976. In cases where more than one author expressed factors with very similar meaning, only one of the factors has been reported.

I. Satiety (4,6). This was also expressed as "satisfies hunger" (7).

a. unsatisfying/satisfying (4,6)
b. light/heavy (4).

II. Physiological Tolerance. This was expressed as "physiological reaction" (13) and "tolerance" (6).

a. never tolerate/tolerate at all times (6)

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[3] (1) Bremer and Weatherholz, 1975; (2) Brown, 1976; (3) Cosper and Wakefield, 1975; (4) Fewster *et al.*, 1973; (5) Green, 1975; (6) Krondl and Lau, 1978; (7) Lachance, 1978; (8) Lamb, 1969; (9) Lowenberg, 1970; (10) Martin, 1976; (11) Martinsen and McCullough, 1977; (12) McFadyen *et al.*, 1973; (13) Niehoff, 1969; (14) Rhee and Stubbs, 1976; (15) Schafer, 1978; (16) Schafer and Yetley, 1975)

III. Aesthetic-Sensory (4). This was also expressed as "taste" (6,15), "flavor" (4,11), "smell" (10), "aroma" (4), and "appearance" (4,10,15).

a. tastes very bad/tastes very good (6)
b. unappetizing/appetizing (4,10)
c. no smell/has a smell (10)
d. inferior/superior (4)

and the following single ideas:

a. nice to look at (5)
b. texture (15)
c. tastes good (1,3)
d. taste and enjoyment (2)
e. odour (15)

IV. Familiarity (6,8). This was also expressed as "communication" (4).

a. never ate/ate it often as a child (6)
b. less/more familiar with (10)
c. have never/have tasted (10)
d. rarely think/often think about this food (4)
e. rarely talk/frequently talk about this food (4)
f. do not like/ like to read or hear about this food (4)
g. would not like/ would like to know more about this food (4)

and the following single ideas:

a. mass media (15,16)
b. habit (2,15)
c. religion (9,15)
d. education programs (15,16)
e. consumer information (15)

V. Health and Safety (10,14,15,16). This was also expressed as "health belief" (6), "health of the family" (15), "perceived health apprehensions" (4), and "perceived health needs" (4).

a. extremely unhealthy/essential to health (6)
b. not needed/needed for general health (4)
c. eat because necessary in diet/eat for enjoyment or variation (10)
d. not essential/essential in diet (10)
e. unimportant/important (4)
f. causes/does not cause allergy (4)

g. contributes/does not contribute to heart disease (4)
h. contributes/does not contribute to high blood pressure (4)
i. not safe to eat/safe to eat (10)

and the following single ideas:

a. additives (5)
b. good for you (3)
c. to keep you from starving (2)
d. specific illness (14)
e. food regulations (5)

VI. Quality Characteristics (5).

a. not much variety/good variety available in this product (10)
b. quality varies from week to week/always good quality (10)
c. not satisfactorily/satisfactorily packaged in supermarket (12)
d. less tender/very tender (12)
e. little/much of this food is wasted (12)

and the following single ideas:

a. labelling (5)
b. Canadian products (5)
c. freshness (11)

VII. Symbolism (4).

a. food for a main meal/a snack (10)
b. only part of a meal/a complete meal in itself (10)
c. generally eat at home/eat out (10)
d. more suitable for lunch or breakfast/ a main meal (12)
e. seasonal/year round food (4)
f. common food (not from a particular ethnic group)/ethnic food (10)
g. better for children than for adults/better for adults than for children (4)
h. not good/good for a baby (10)
i. basic everyday food/special season food (10)

and the following single ideas:

a. anxiety relief (7,9)

b. security (4,9)
c. power (16)
d. tradition (4,13)
e. reward (4,7)
f. punishment (4,7)
g. creativity (9)
h. novelty (15)
i. strengthen feelings of group belonging (9)
j. initiates, maintains interpersonal relationships (7)
k. influences behaviour of others (7)

VIII. Suitability for Guests. This was expressed as "entertaining" (10), "hospitality" (9), "prestige" (6,8,13), and "status group differences" (4,9).

a. would not/would serve to guests (12)
b. everyday family food/food for entertaining guests (10)

IX. Price (5,6,10,12). This was also expressed as "specials" (10), "cost" (10,13,15), and "economic perceptions" (4).

a. expensive/inexpensive (10, 12)
b. low food value/high food value for the money (4,10)
c. should not/should be offered as a special (10)

X. Preparation-Related (10). This was also expressed as "food-storage" (10), "difficulty in purchase" (10), "convenience" (4,6,15).

a. requires long cooking or preparation time/can be quickly prepared (12)
b. requires time and effort to buy/easy to buy (10)
c. not many/many ways to prepare (10)
d. don't like/like to prepare (10)
e. hard/easy to prepare (10)
f. doesn't store well/stores well (10)
g. leftovers can be used for another meal/serve only once (10)
h. does not freeze well/can be frozen and kept on hand (10)

XI. Nutritional Value (10,12). This was also expressed as "nutrition knowledge" (6), "provides nutrients" (7), "good nutrition and energy" (2), "food value" (4), "nutrition" (1,5,15,16).

a. low food value/nutritious (12)

b. fattening/not fattening (10)
c. low/high energy (4)
d. low/high protein content (10)
e. low/high carbohydrate content (10)
f. low/high in vitamins (10)
g. low/high in minerals (10)
h. high/low in sugar (10)
i. fatty/lean (10,12)
j. artificial/natural (10)
k. highly processed/less processed (10)

and the following single idea:

a. dietary restrictions (2)

XII. Personal and Family Preference (3,15). This was also expressed as "family dislike" (5), "like" (16), "taboos" (9), and "edible by man" (9).

a. don't like/like (4,10,15)
b. only some/most people like this food (10)
c. unpopular/popular in my family (10)

XIII. Availability (10).

a. seldom available/always available (10)

XIV. Overall acceptability (10,16). This was also expressed as "food use frequency" (6).

b. would not/would likely buy (12)
c. eat seldom/eat often (10)
d. never buy/often buy (10)
e. never use/often use this food (4)

and the following frequency of use scale:

use this food (6):
less than once a month
once a month
a few times a month
a few times a week
daily

## XI. APPENDIX B

Image Profiles based on responses to questions about consumer attitudes to selected foods.

The image profiles on the following pages are based on the mean scores for each construct for each food, collected as a result of 113 surveys of households in Edmonton. The poles of the Image Profiles refer to the constructs listed in Table 1 of the text.


Image Profile 1. Skim Milk.....123

Image Profile 2. 2% Milk.....124

Image Profile 3. Sweetened Cereal.....125

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Image Profile 21. Baked Beans.....143

Image Profile 22. Bologna.....144

Image Profile 23. Tossed Salad.....145

Image Profile 24. Whole Wheat Bread.....146

Image Profile 25. White Bread.....147

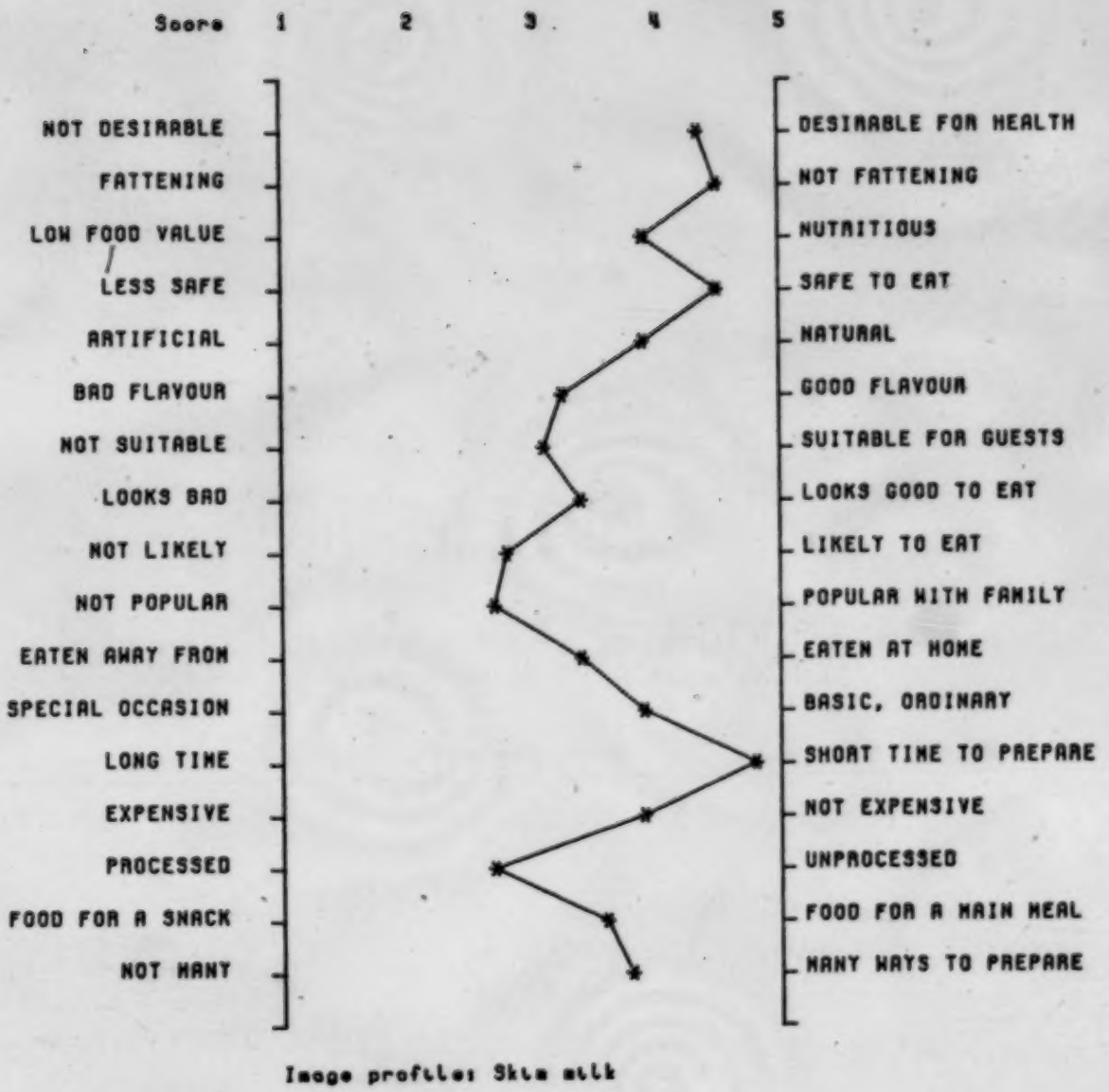


Image Profile 1. Diagrammatic representation of respondent attitudes to Skim Milk.

* represents the mean response score for each construct

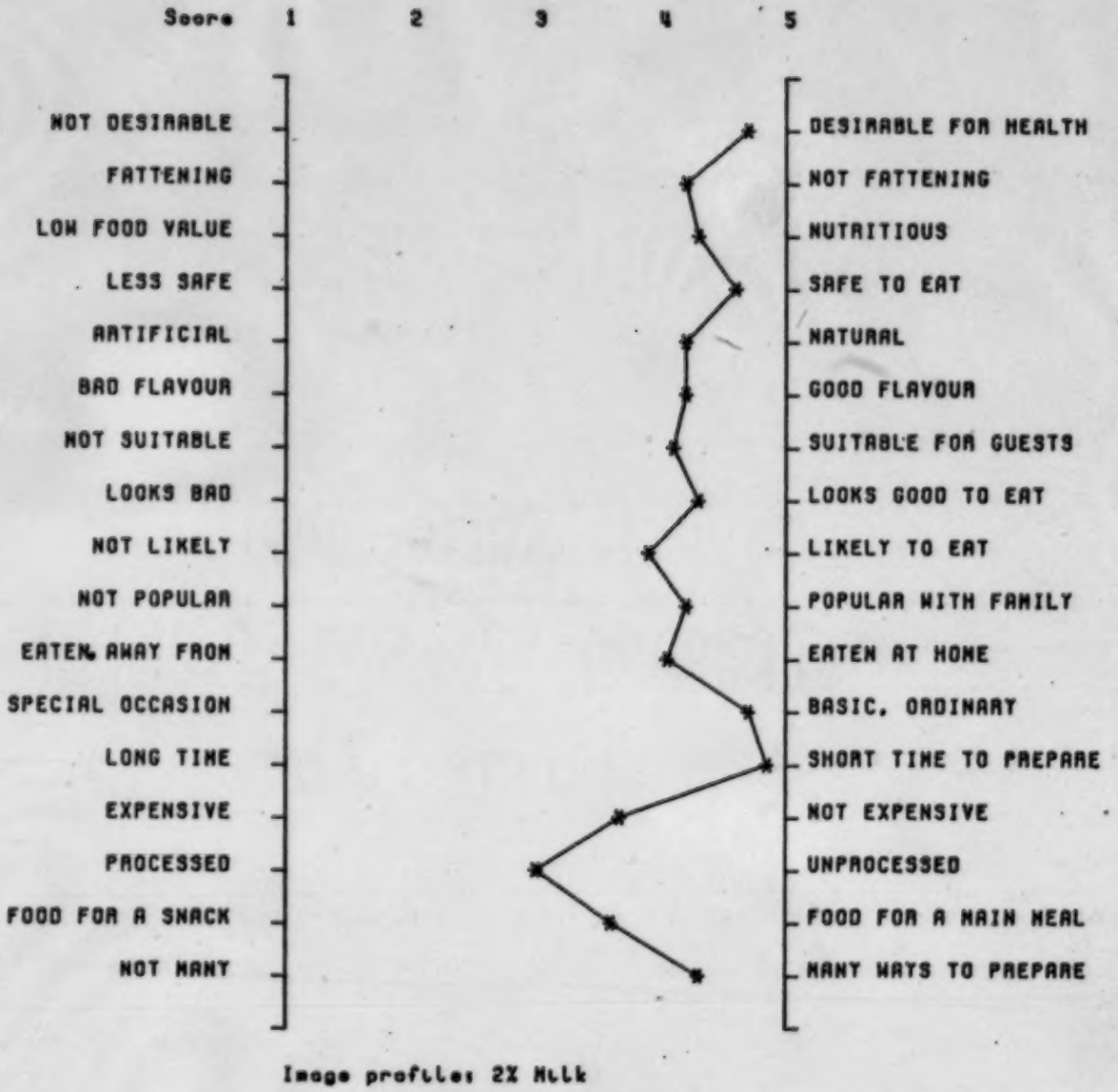


Image Profile 2. Diagrammatic representation of respondent attitudes to 2% Milk.

* represents the mean response score for each construct

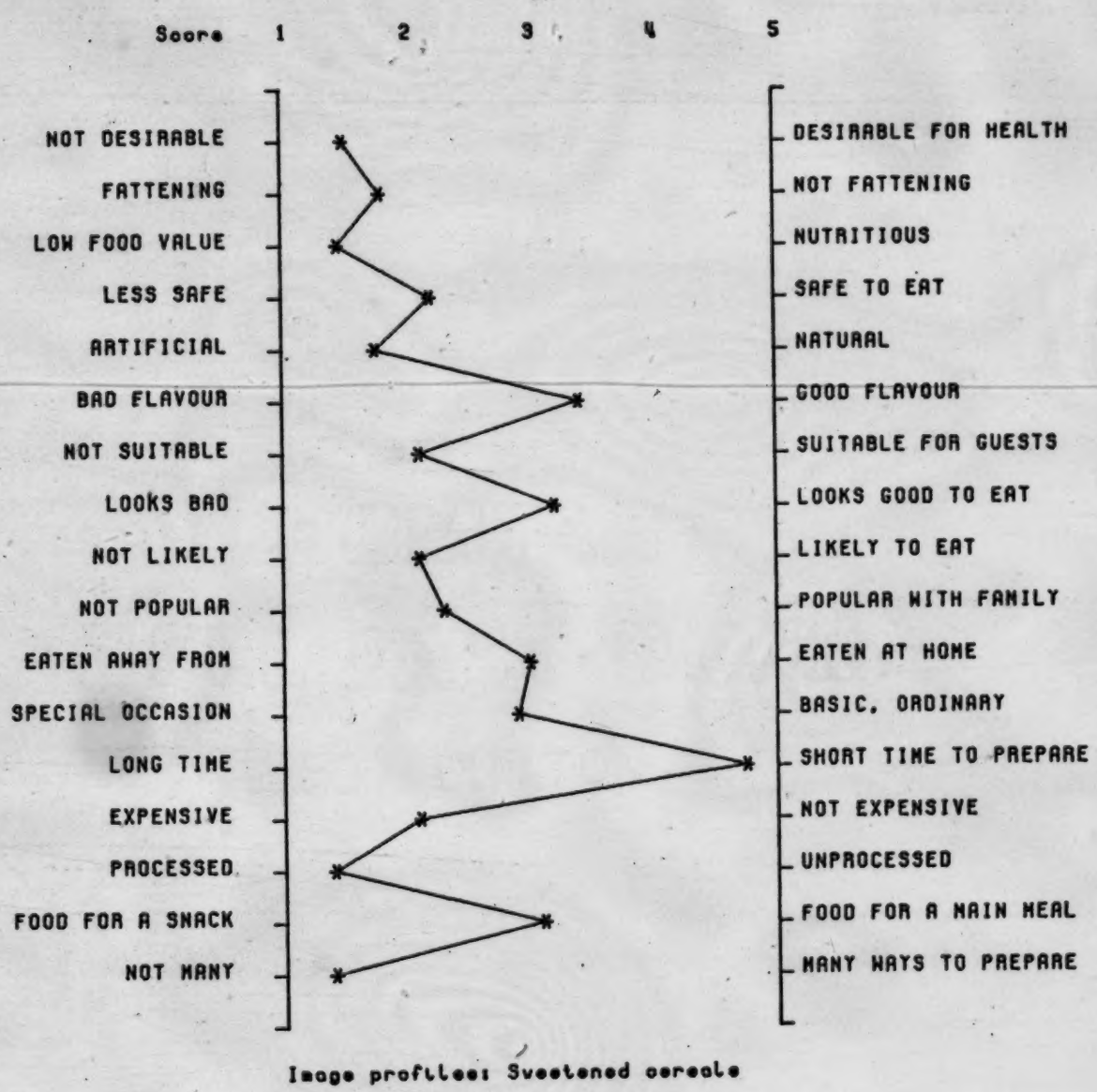


Image Profile 3. Diagrammatic representation of respondent attitudes to Sweetened Cereal.

* represents the mean response score for each construct

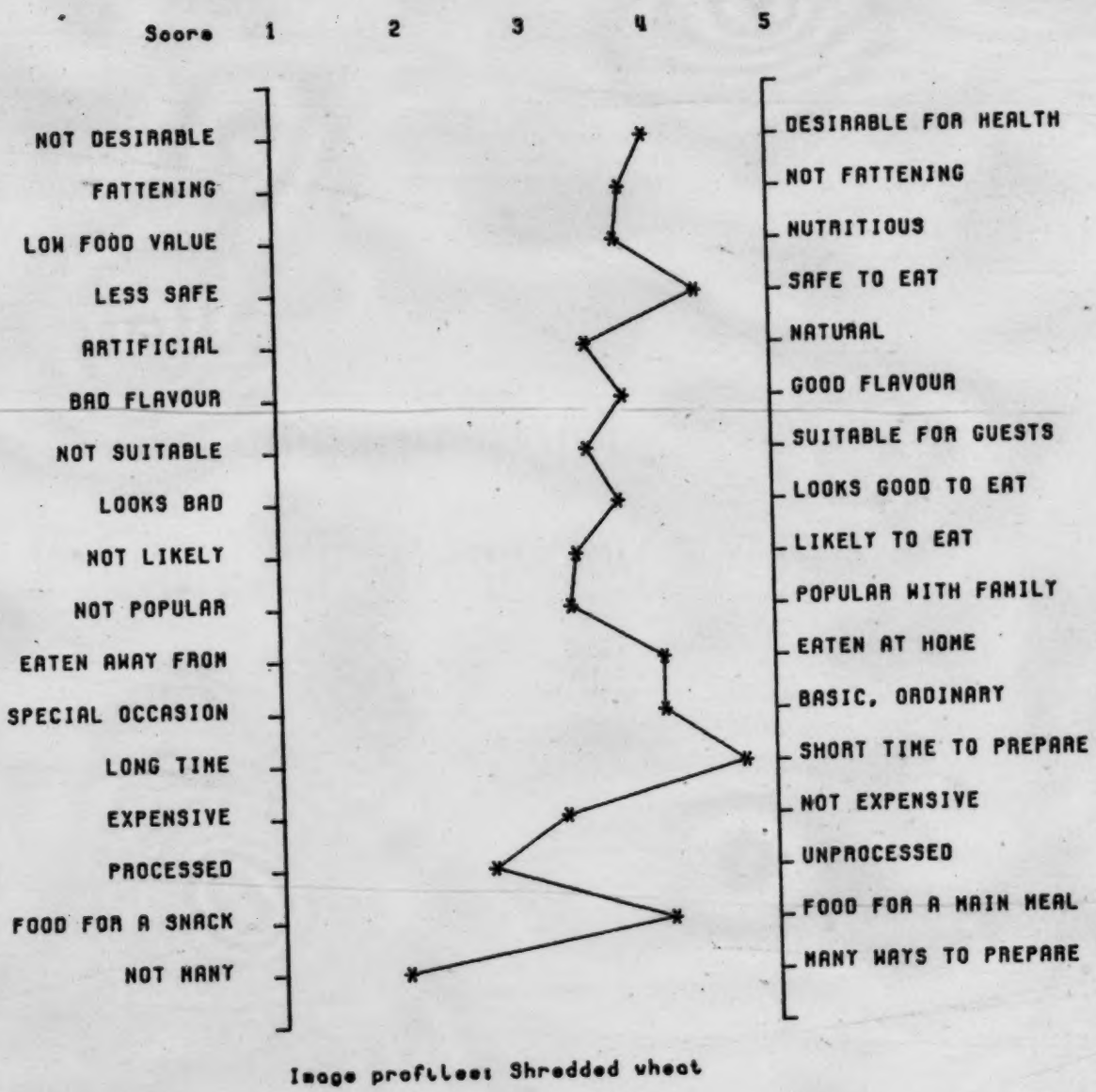


Image Profile 4. Diagrammatic representation of respondent attitudes to Shredded Wheat Cereal.

* represents the mean response score for each construct

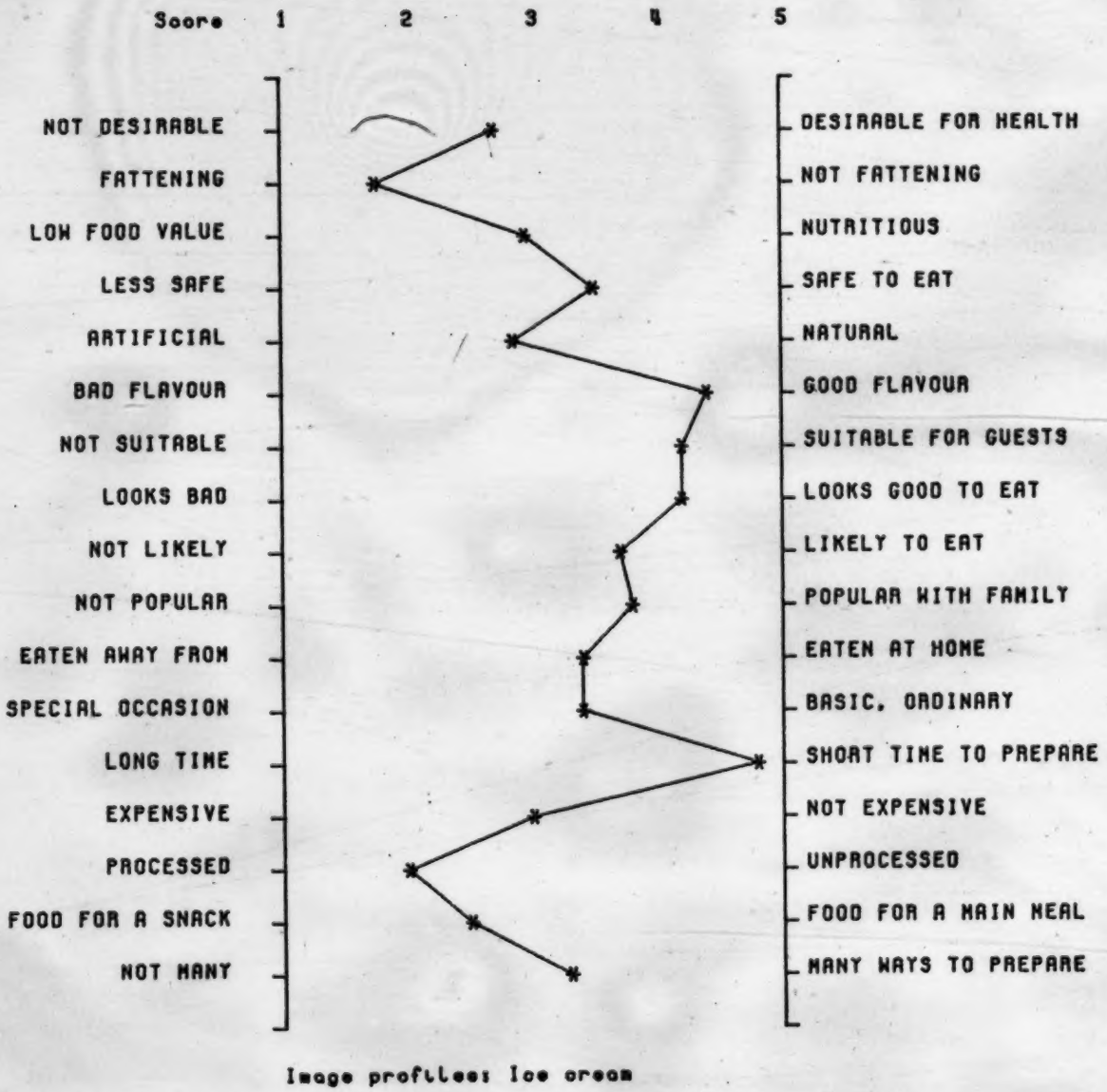


Image Profile 5. Diagrammatic representation of respondent attitudes to Ice Cream.

* represents the mean response score for each construct

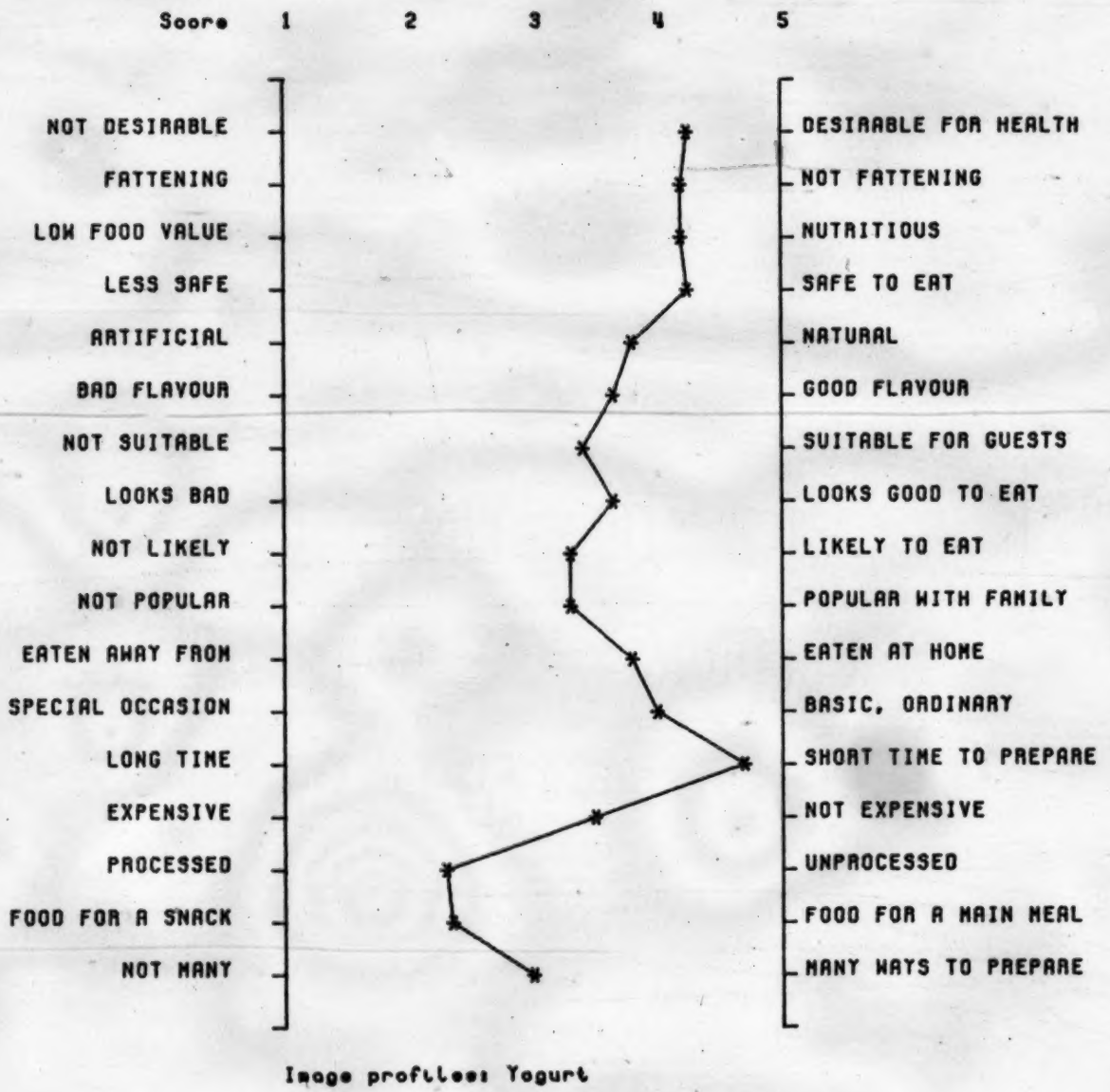


Image Profile 6. Diagrammatic representation of respondent attitudes to Yogurt.

* represents the mean response score for each construct

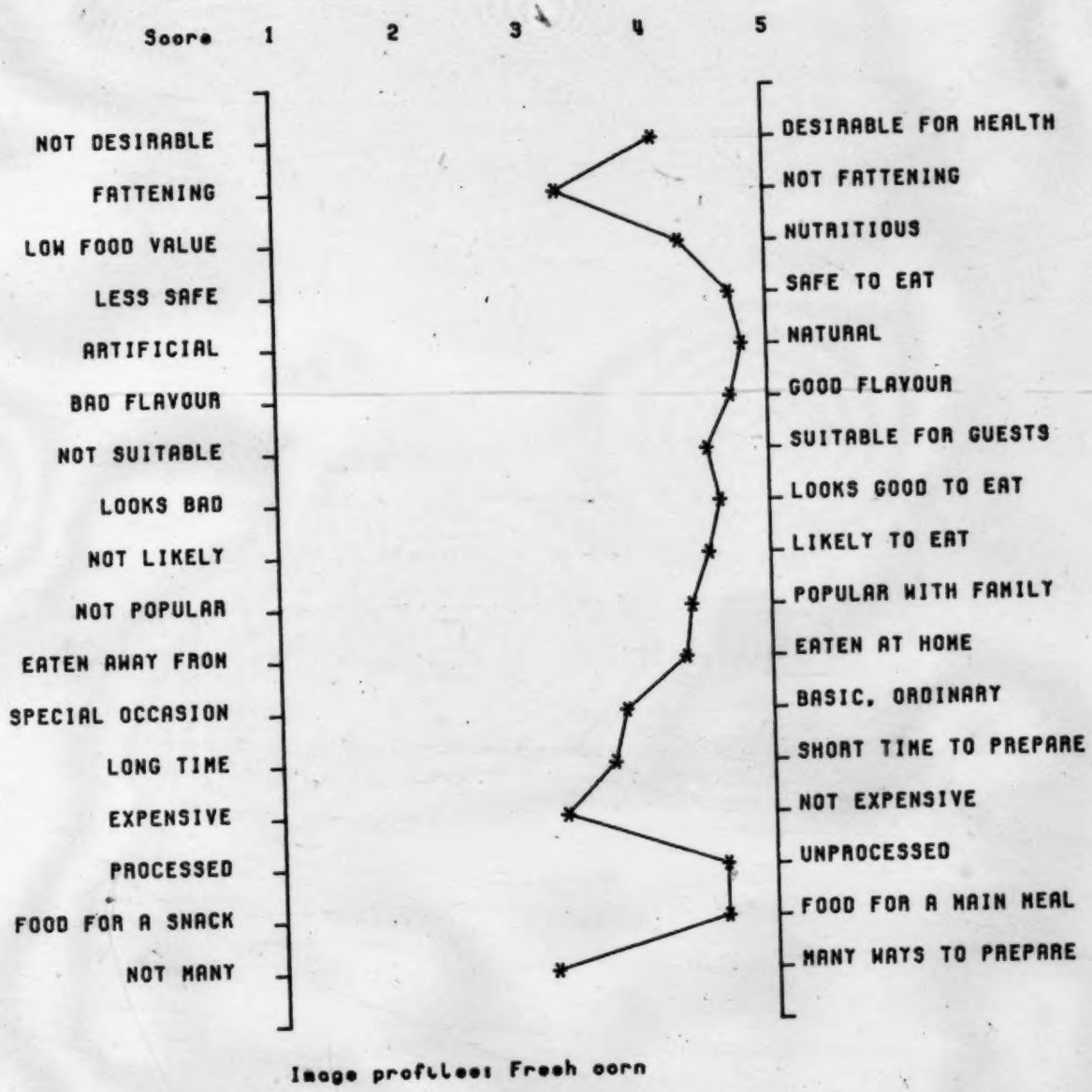


Image Profile 7. Diagrammatic representation of respondent attitudes to Fresh Corn.

* represents the mean response score for each construct

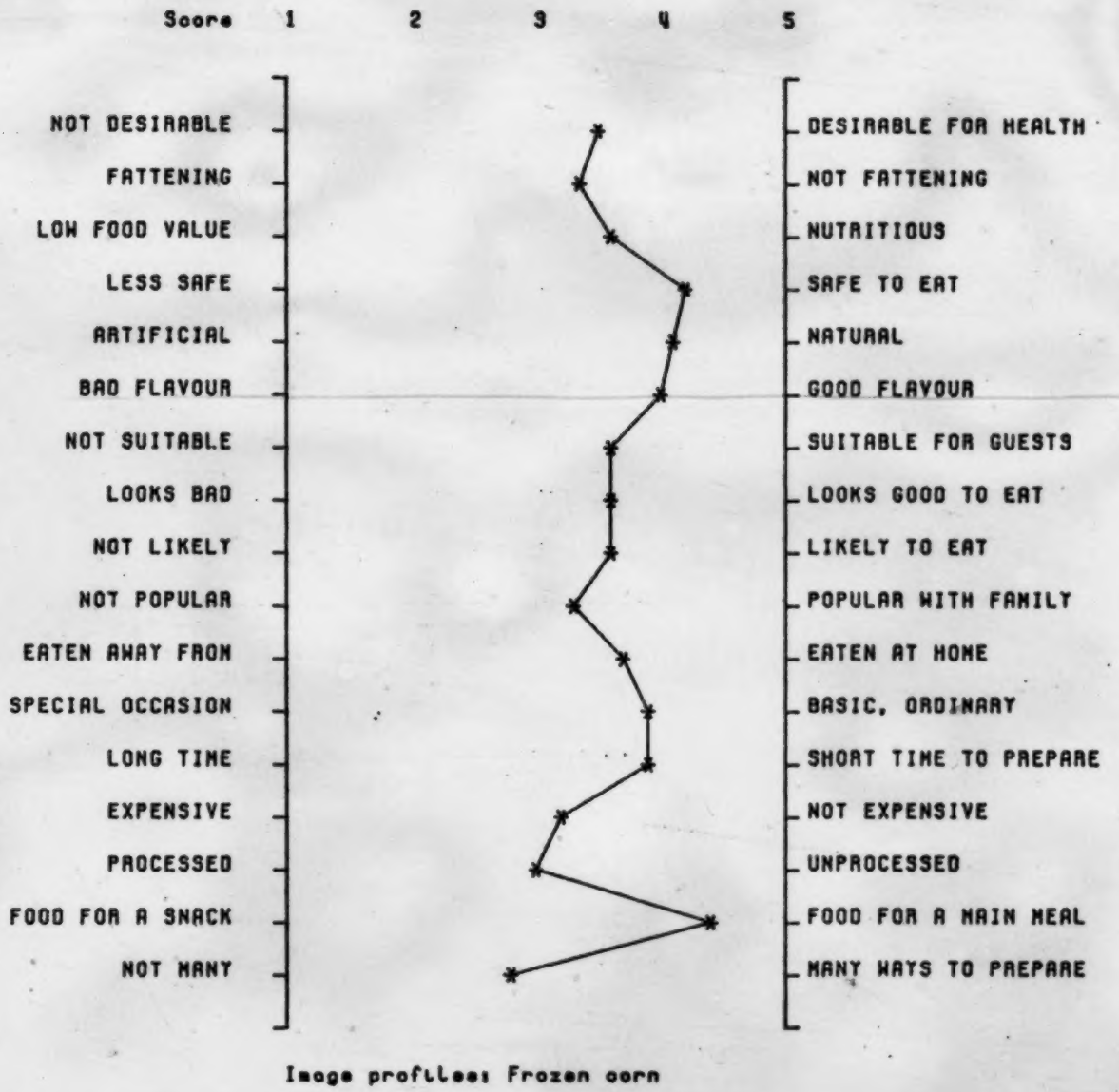


Image Profile 8. Diagrammatic representation of respondent attitudes to Frozen Corn.

* represents the mean response score for each construct

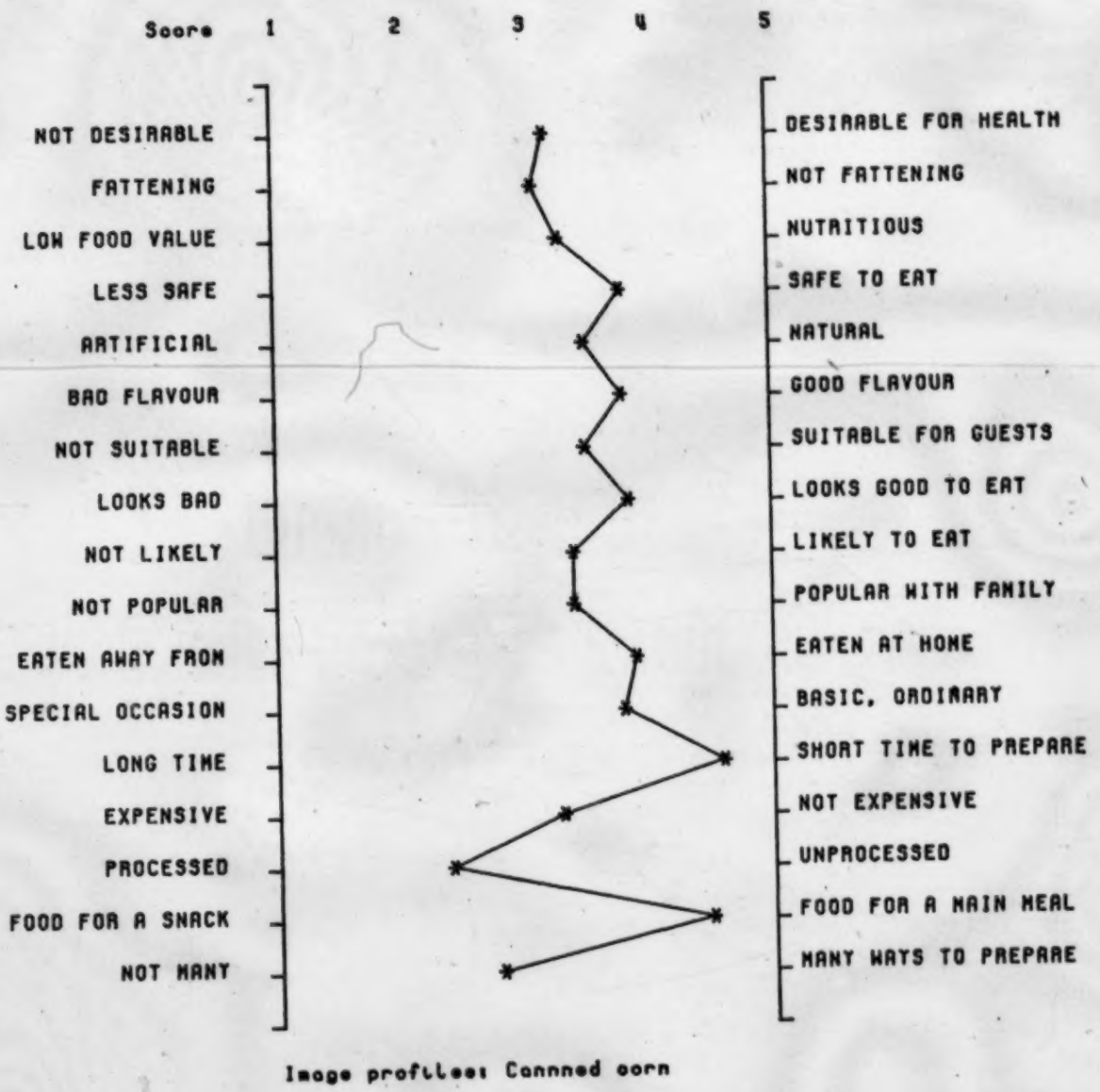


Image Profile 9. Diagrammatic representation of respondent attitudes to Canned Corn.

* represents the mean response score for each construct

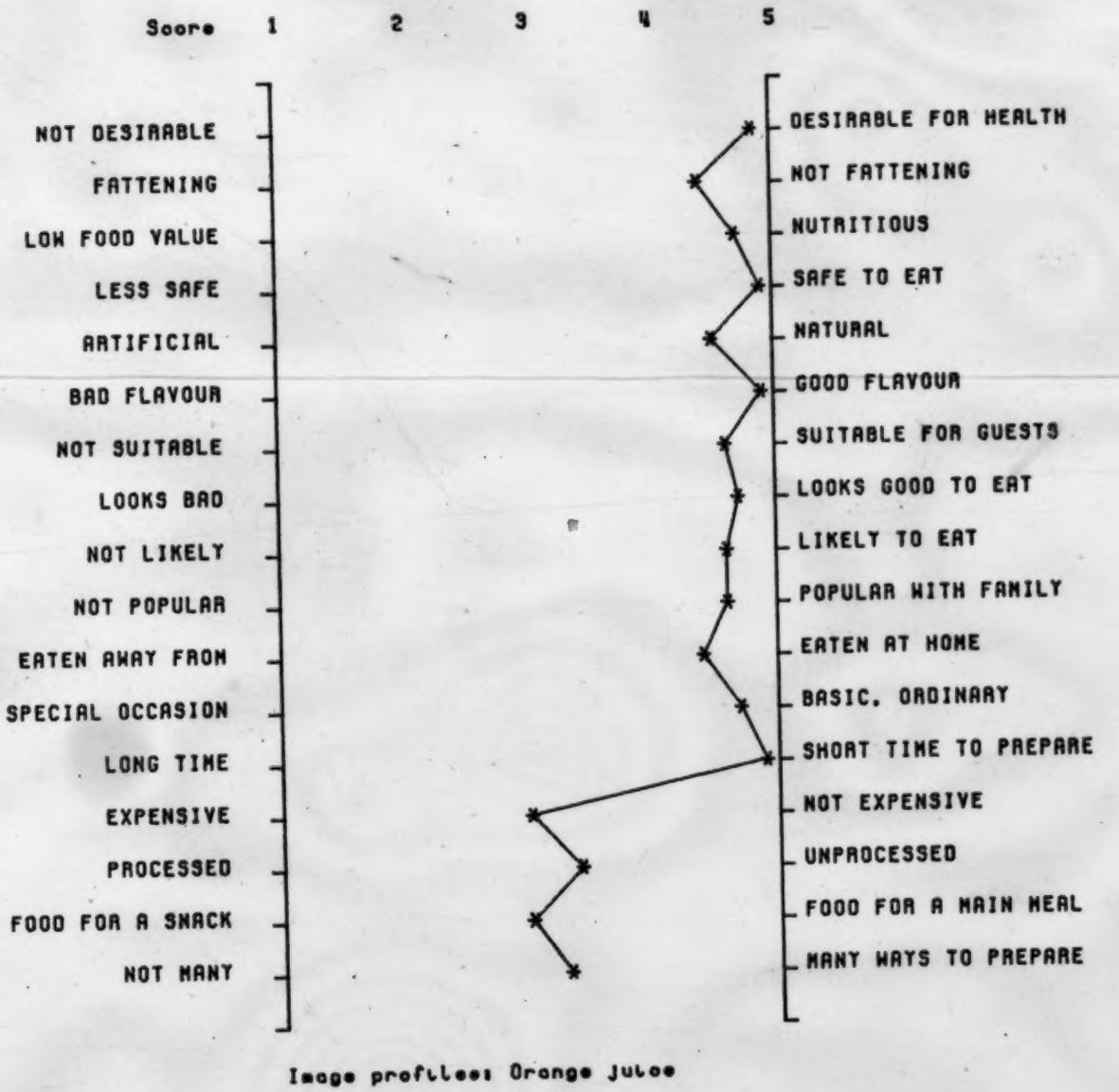


Image Profile 10. Diagrammatic representation of respondent attitudes to Orange Juice.

* represents the mean response score for each construct

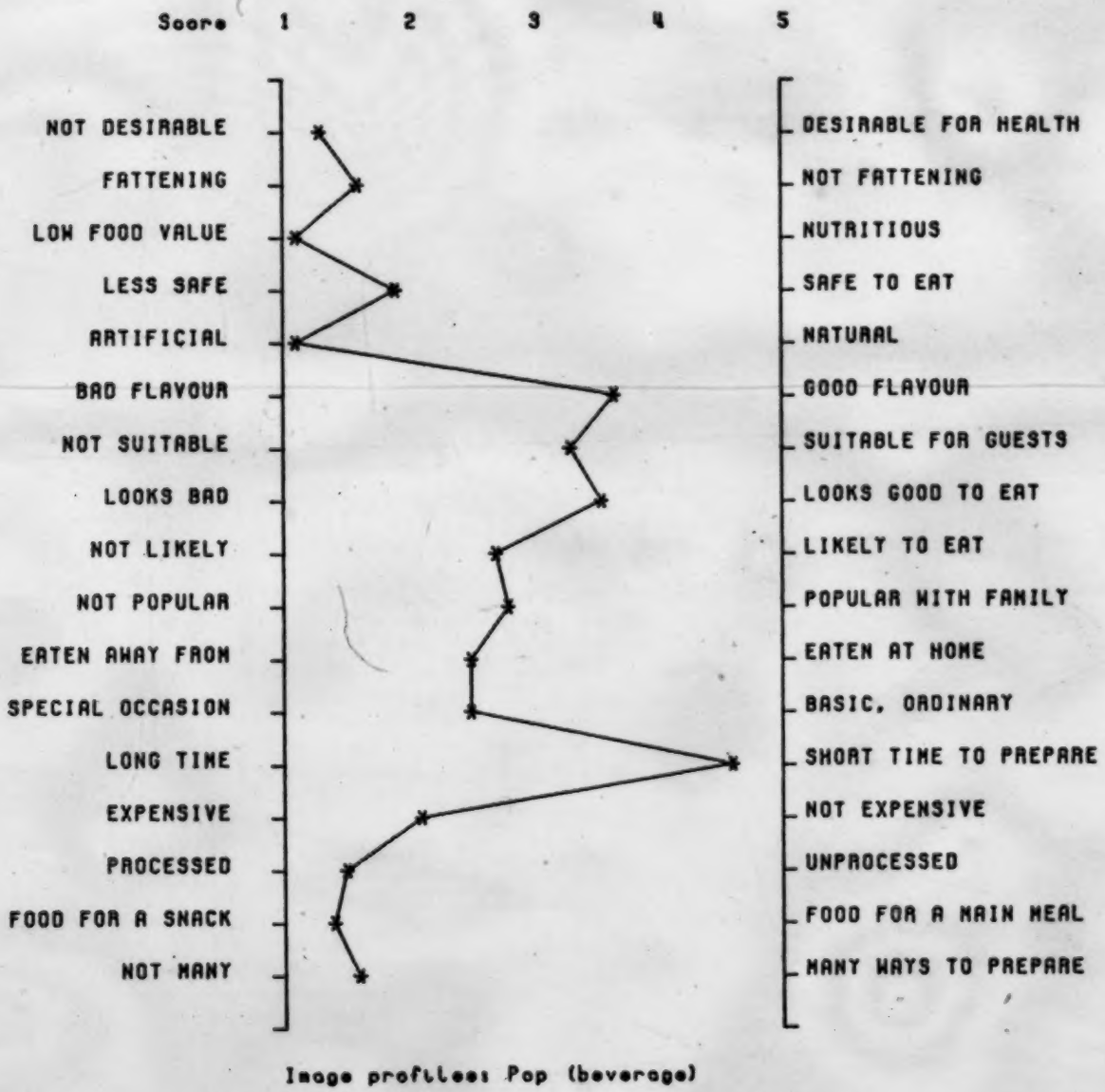


Image Profile 11. Diagrammatic representation of respondent attitudes to "Pop" - carbonated soft drink.

* represents the mean response score for each construct

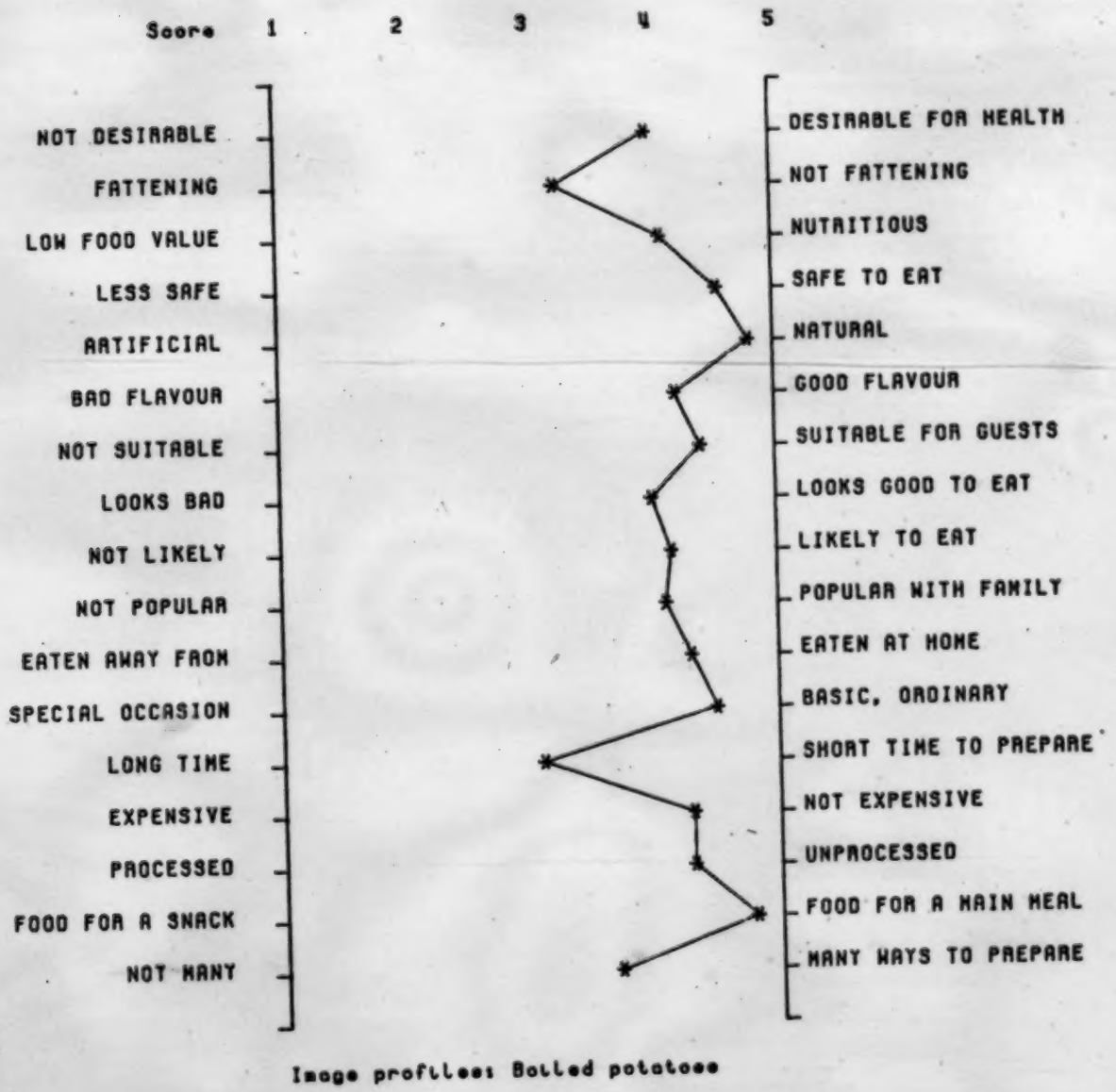


Image Profile 12. Diagrammatic representation of respondent attitudes to Boiled Potatoes.

* represents the mean response score for each construct

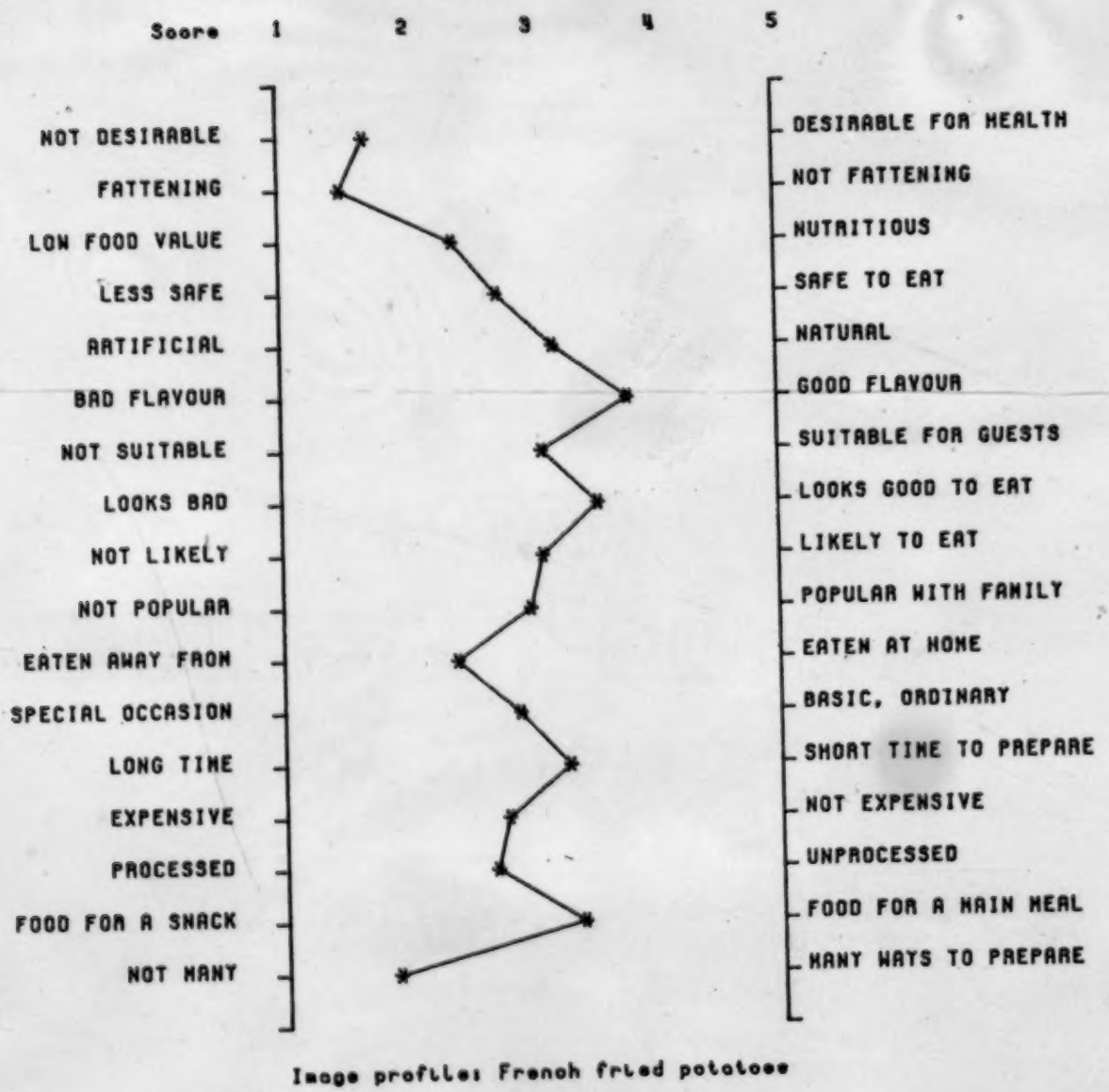


Image Profile 13. Diagrammatic representation of respondent attitudes to French Fried Potatoes.

* represents the mean response score for each construct

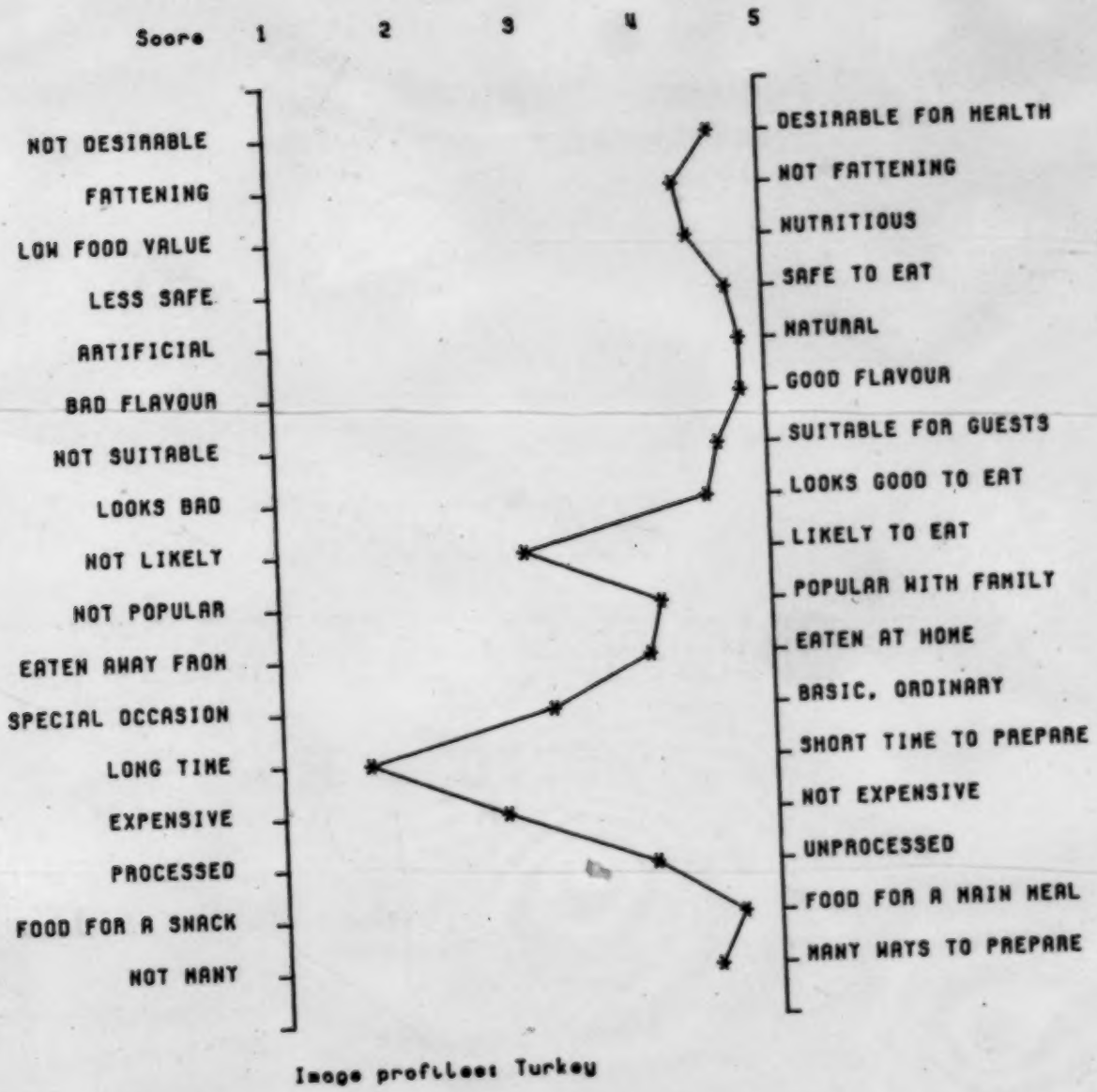


Image Profile 14. Diagrammatic representation of respondent attitudes to Turkey.

* represents the mean response score for each construct

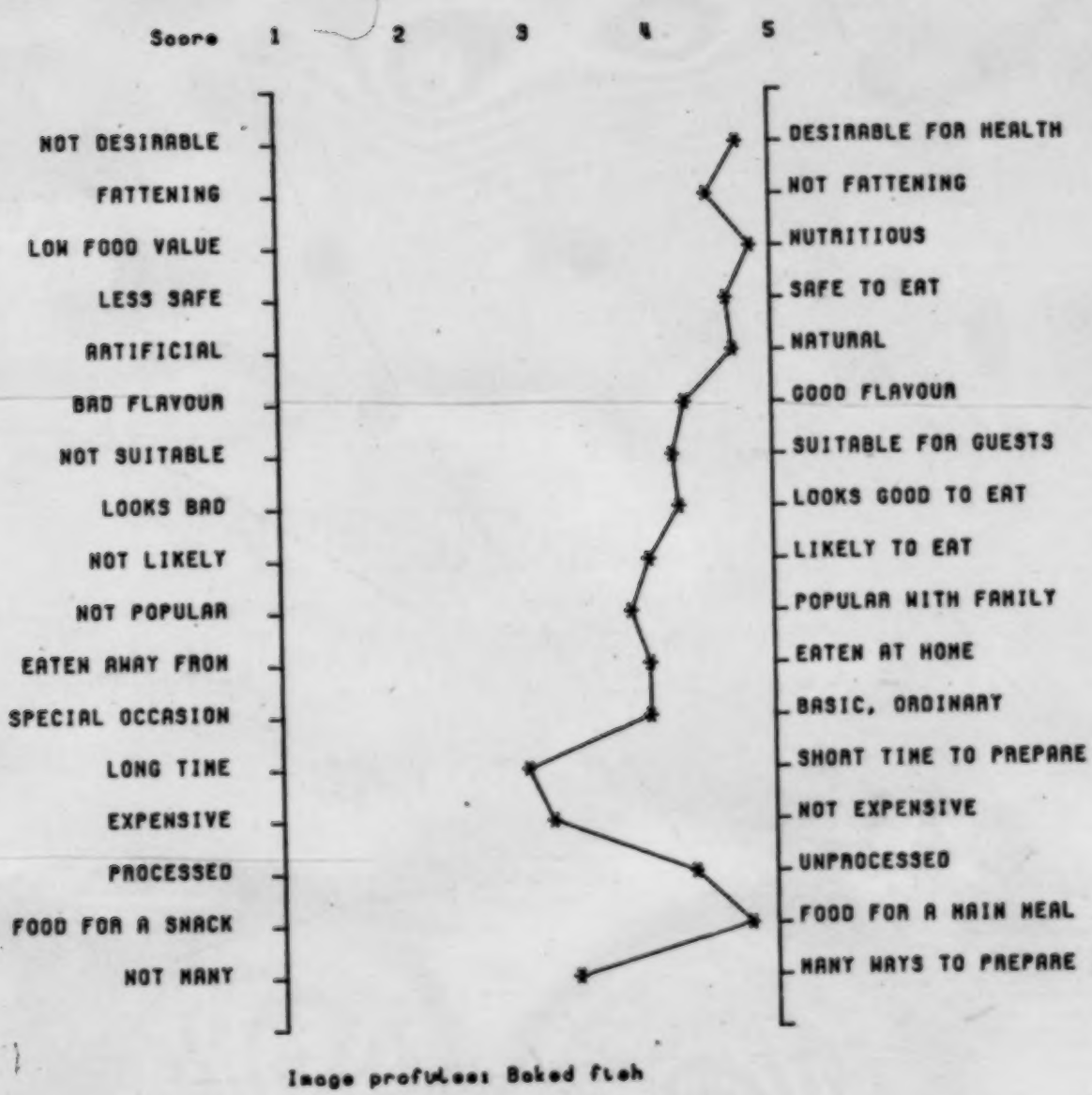


Image Profile 15. Diagrammatic representation of respondent attitudes to Baked Fish.

* represents the mean response score for each construct

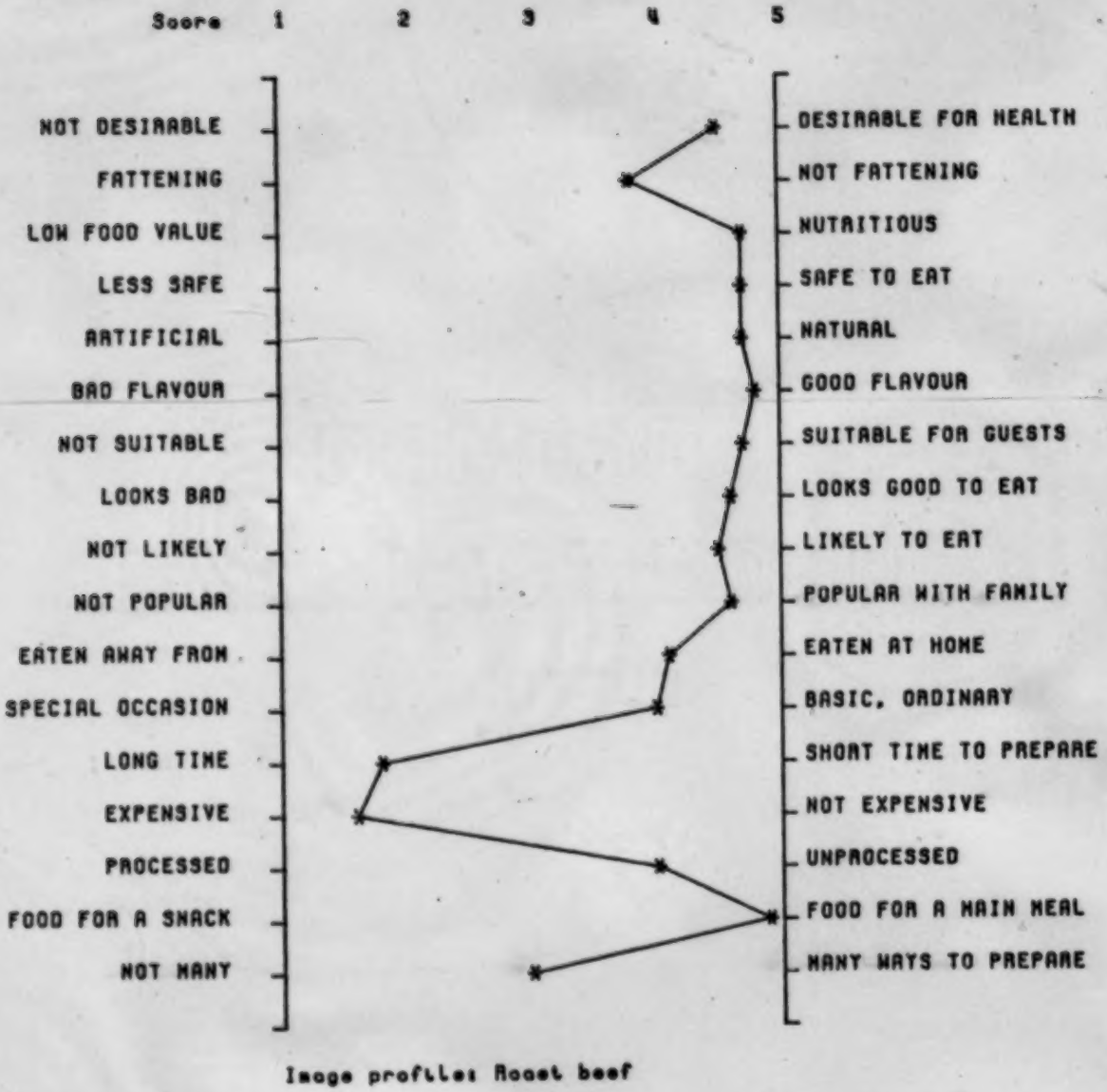


Image Profile 16. Diagrammatic representation of respondent attitudes to Roast Beef.

* represents the mean response score for each construct

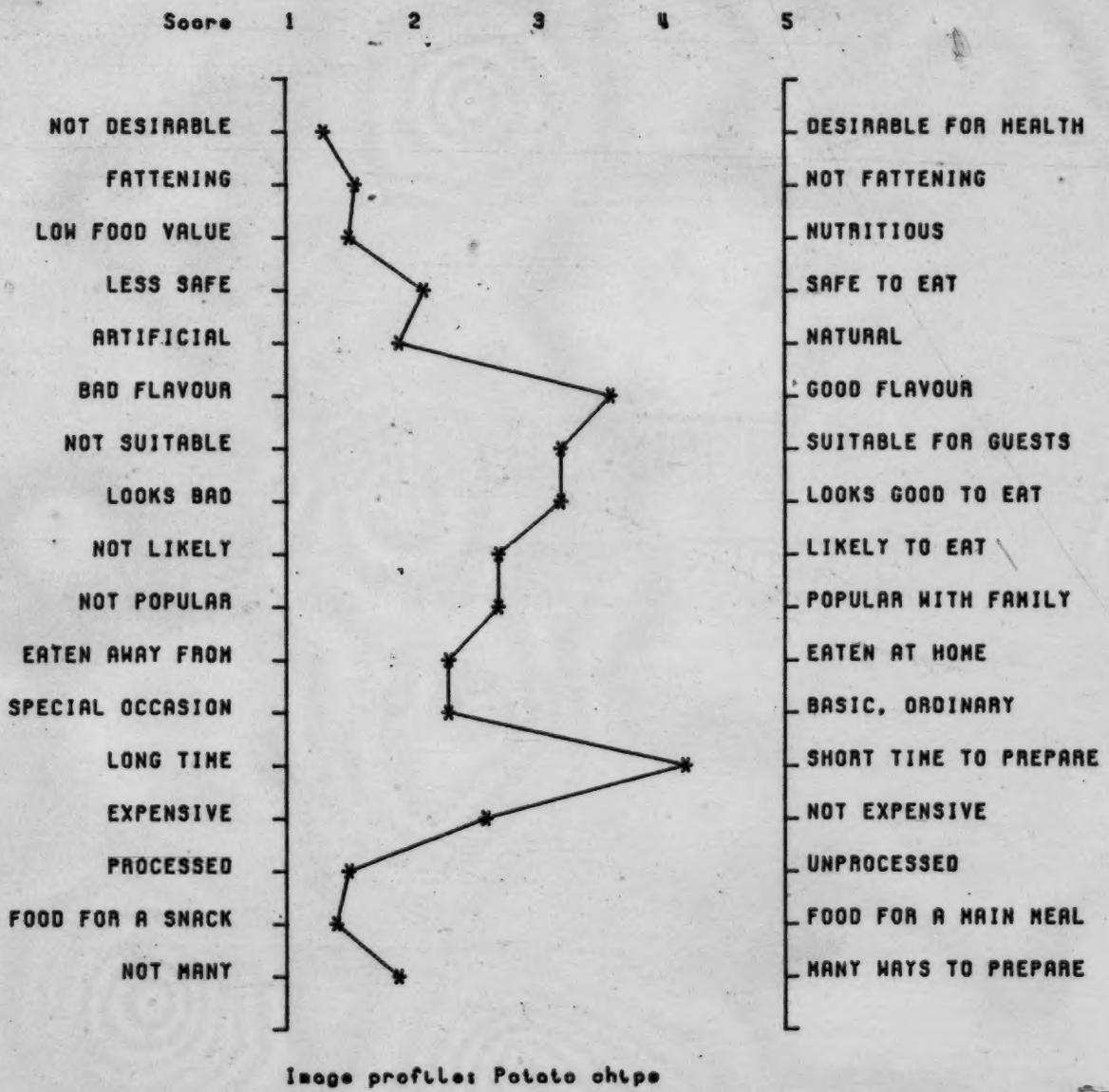


Image Profile 17. Diagrammatic representation of respondent attitudes to Potato Chips.

* represents the mean response score for each construct

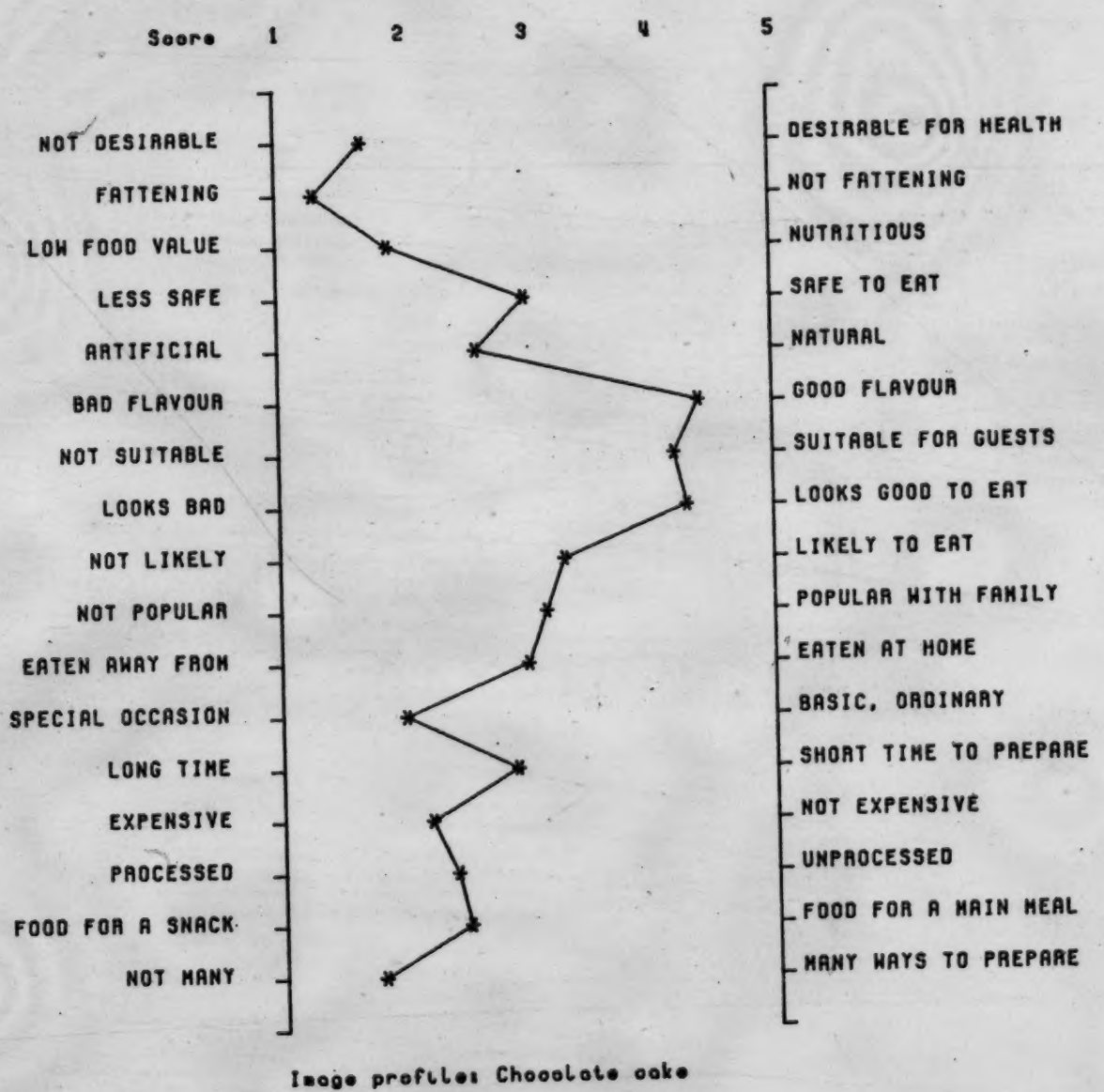


Image Profile 18. Diagrammatic representation of respondent attitudes to Chocolate Cake.

* represents the mean response score for each construct

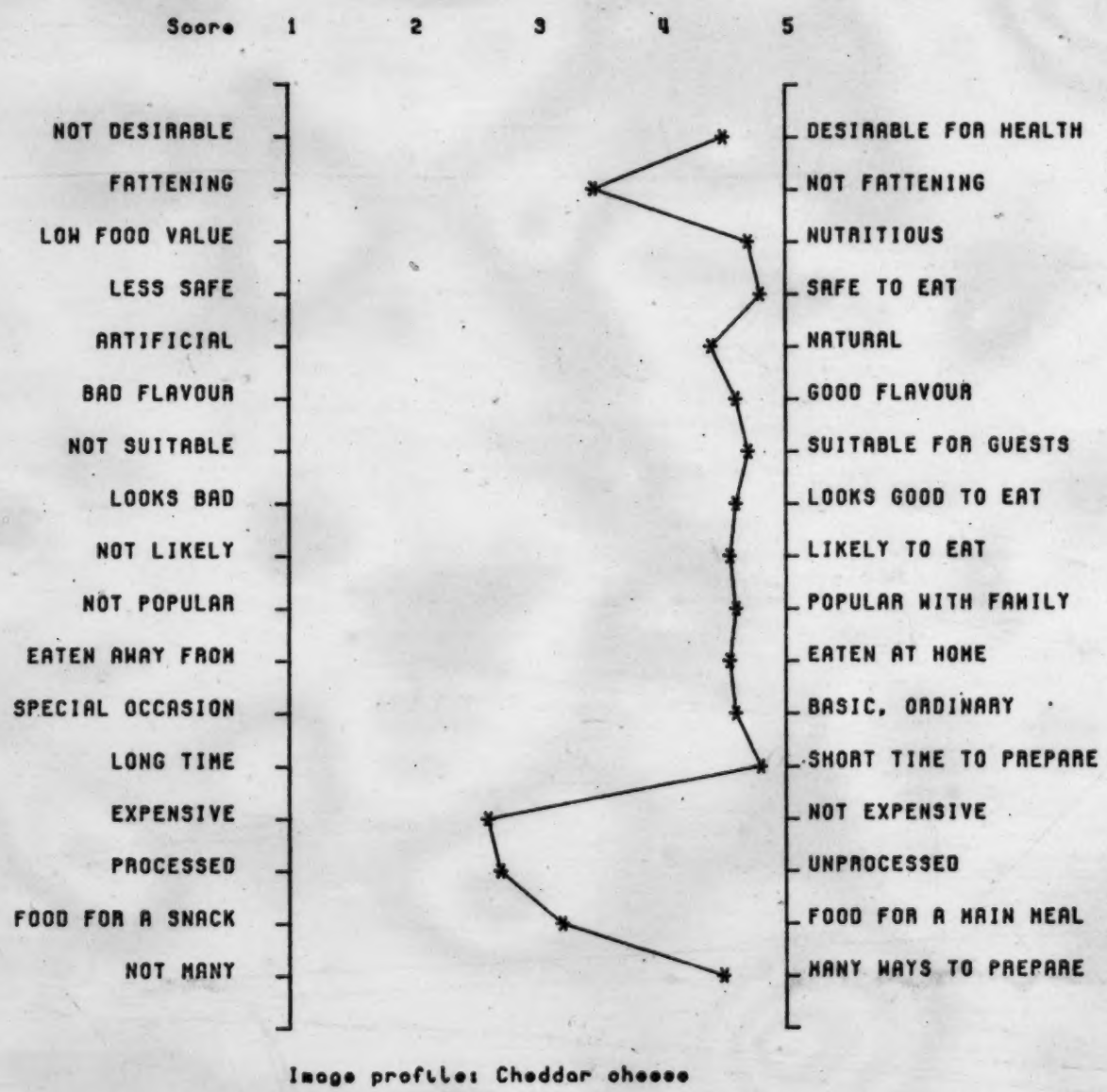


Image Profile 19. Diagrammatic representation of respondent attitudes to Cheddar Cheese.

* represents the mean response score for each construct

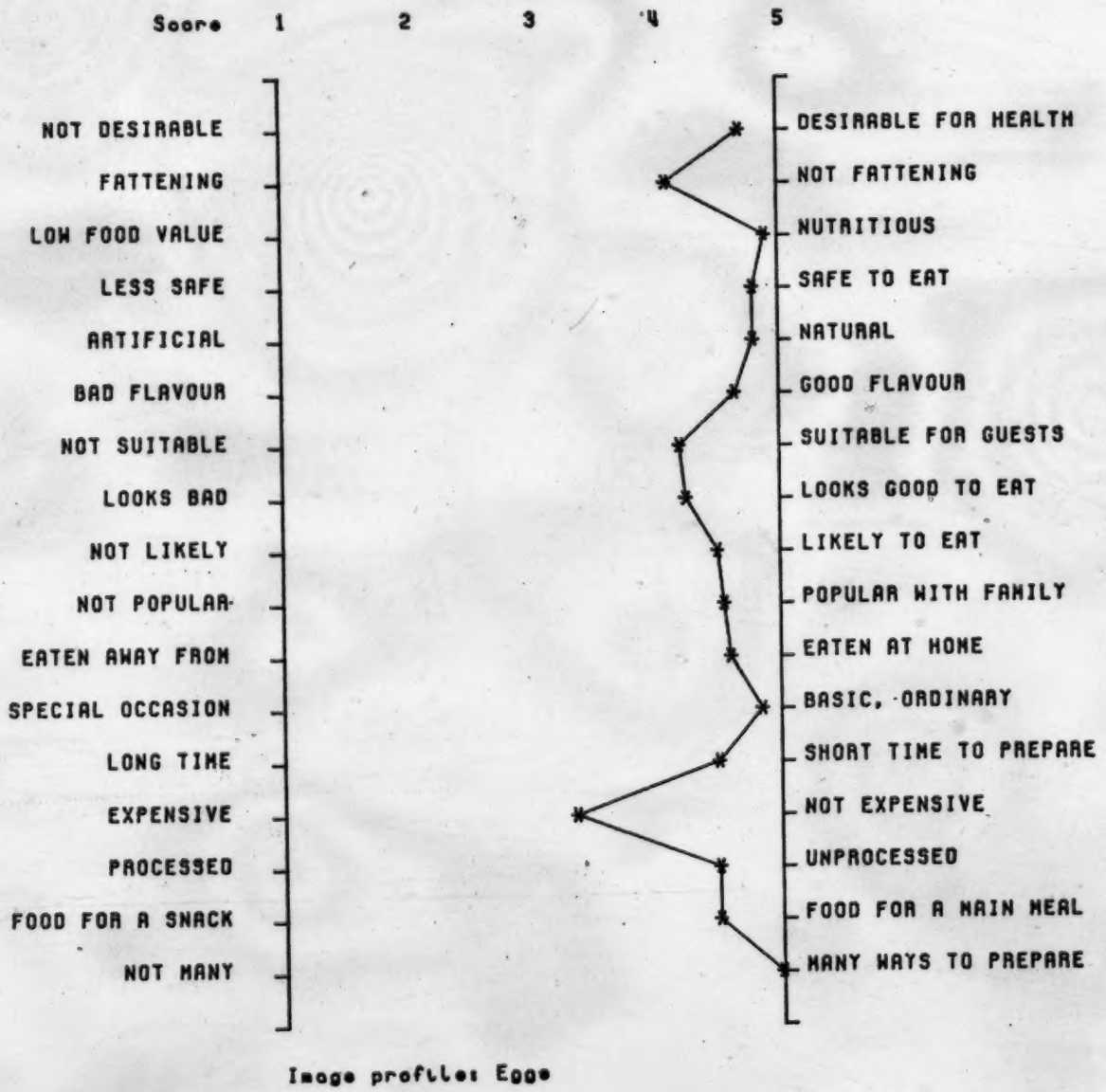


Image Profile 20. Diagrammatic representation of respondent attitudes to Eggs.

* represents the mean response score for each construct

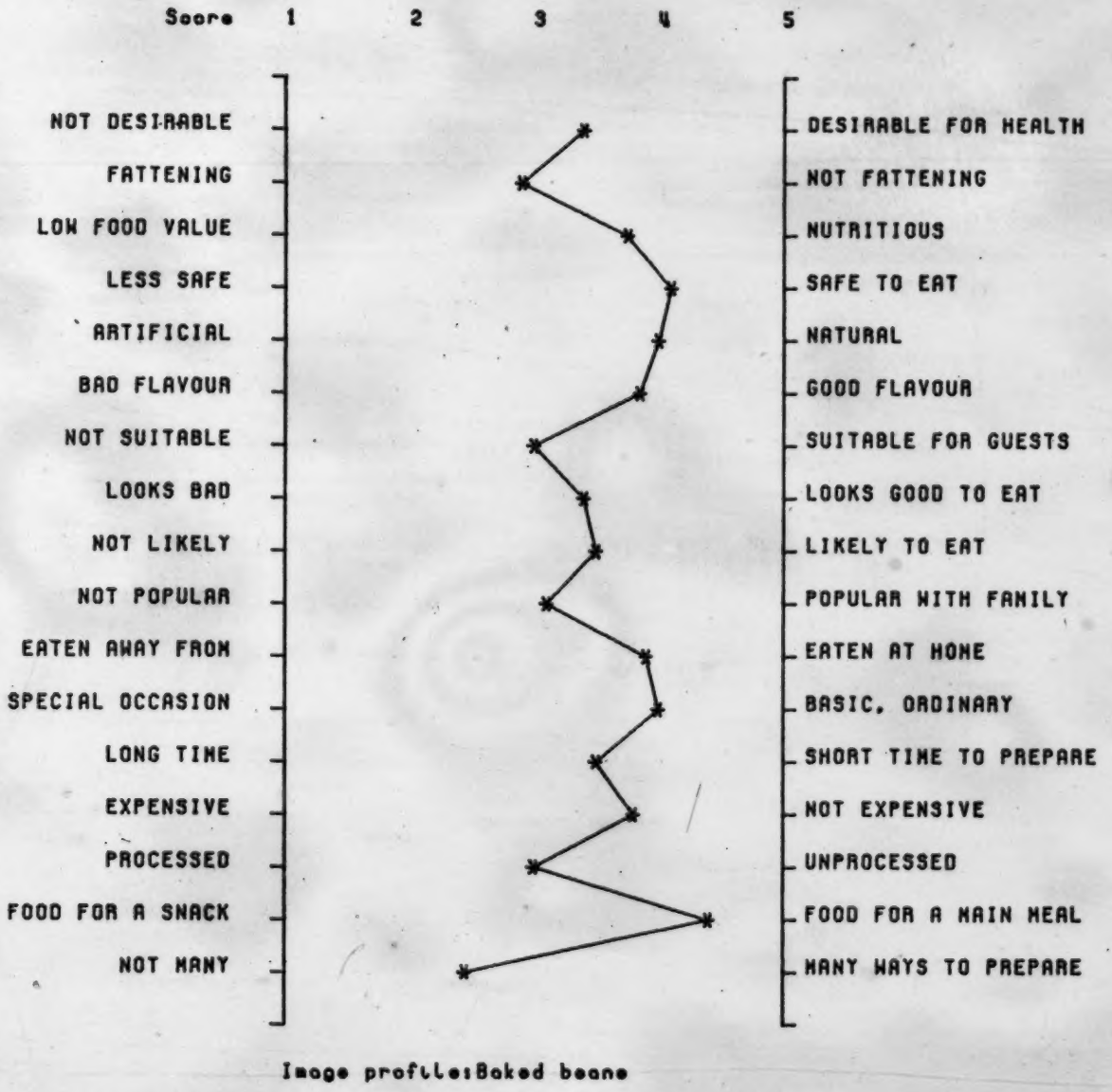


Image Profile 21. Diagrammatic representation of respondent attitudes to Baked Beans.

* represents the mean response score for each construct

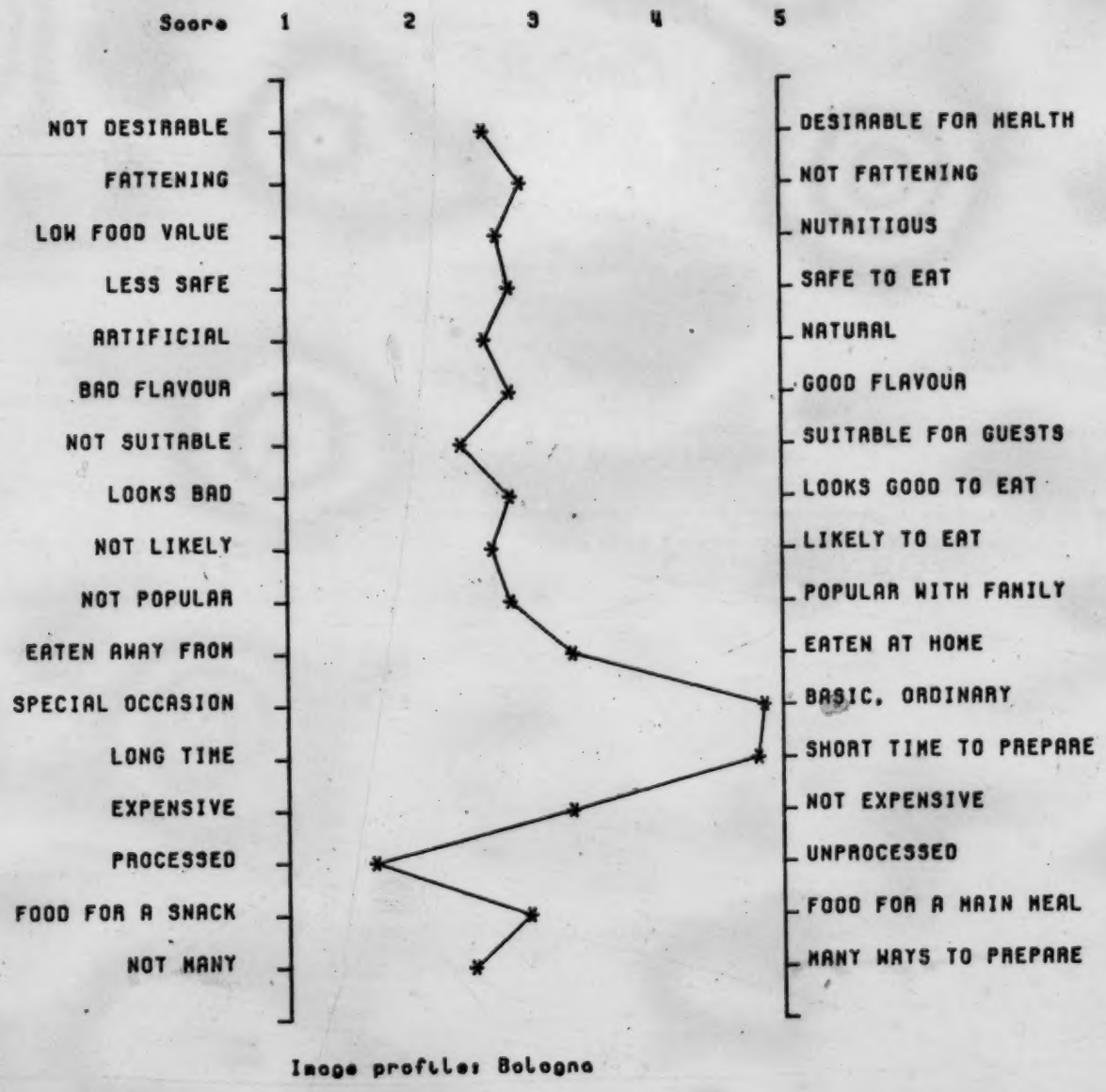


Image Profile 22. Diagrammatic representation of respondent attitudes to Bologna.

* represents the mean response score for each construct

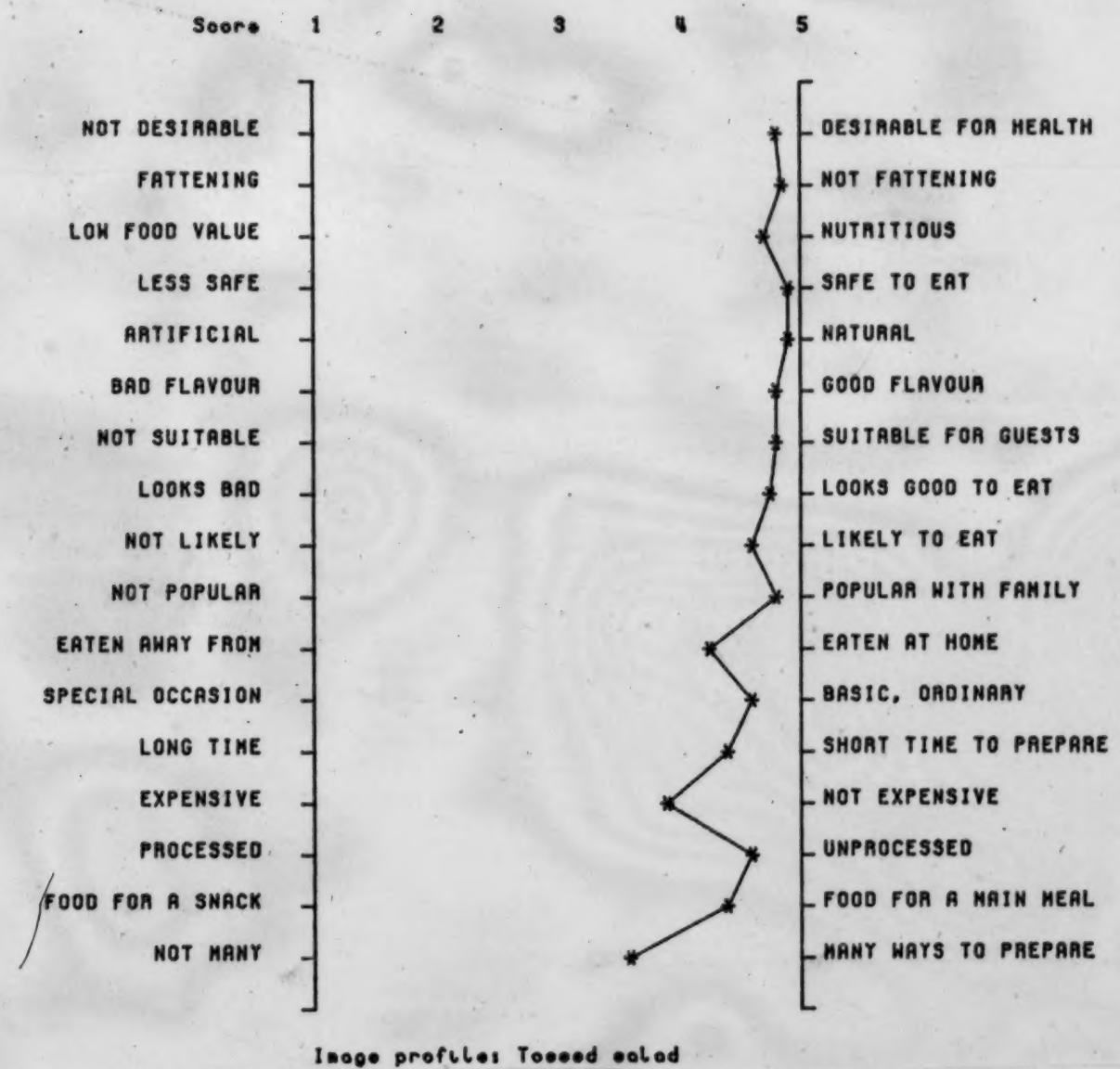


Image Profile 23. Diagrammatic representation of respondent attitudes to Tossed Salad.

* represents the mean response score for each construct

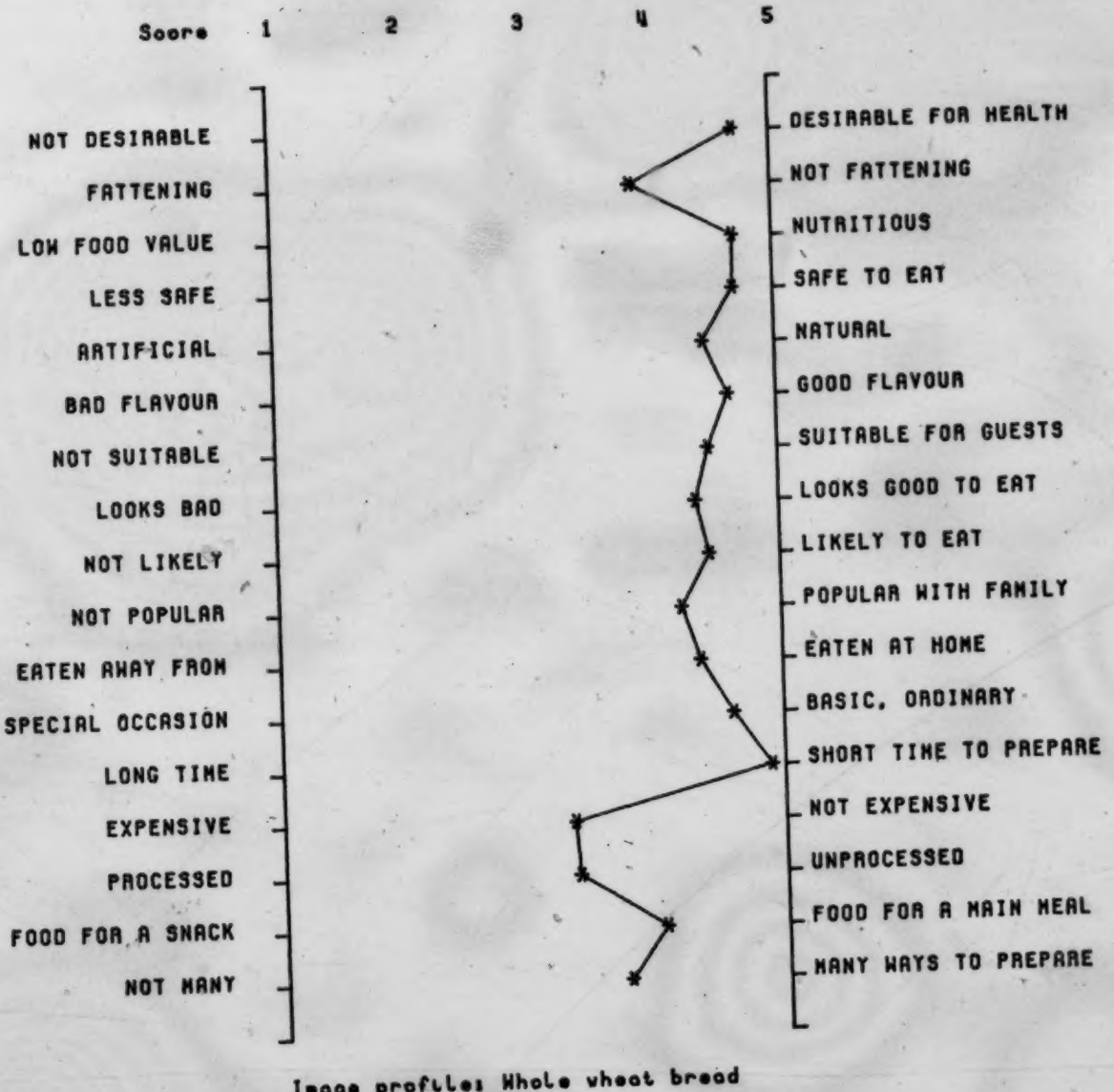


Image Profile 24. Diagrammatic representation of respondent attitudes to Whole Wheat Bread.

* represents the mean response score for each construct

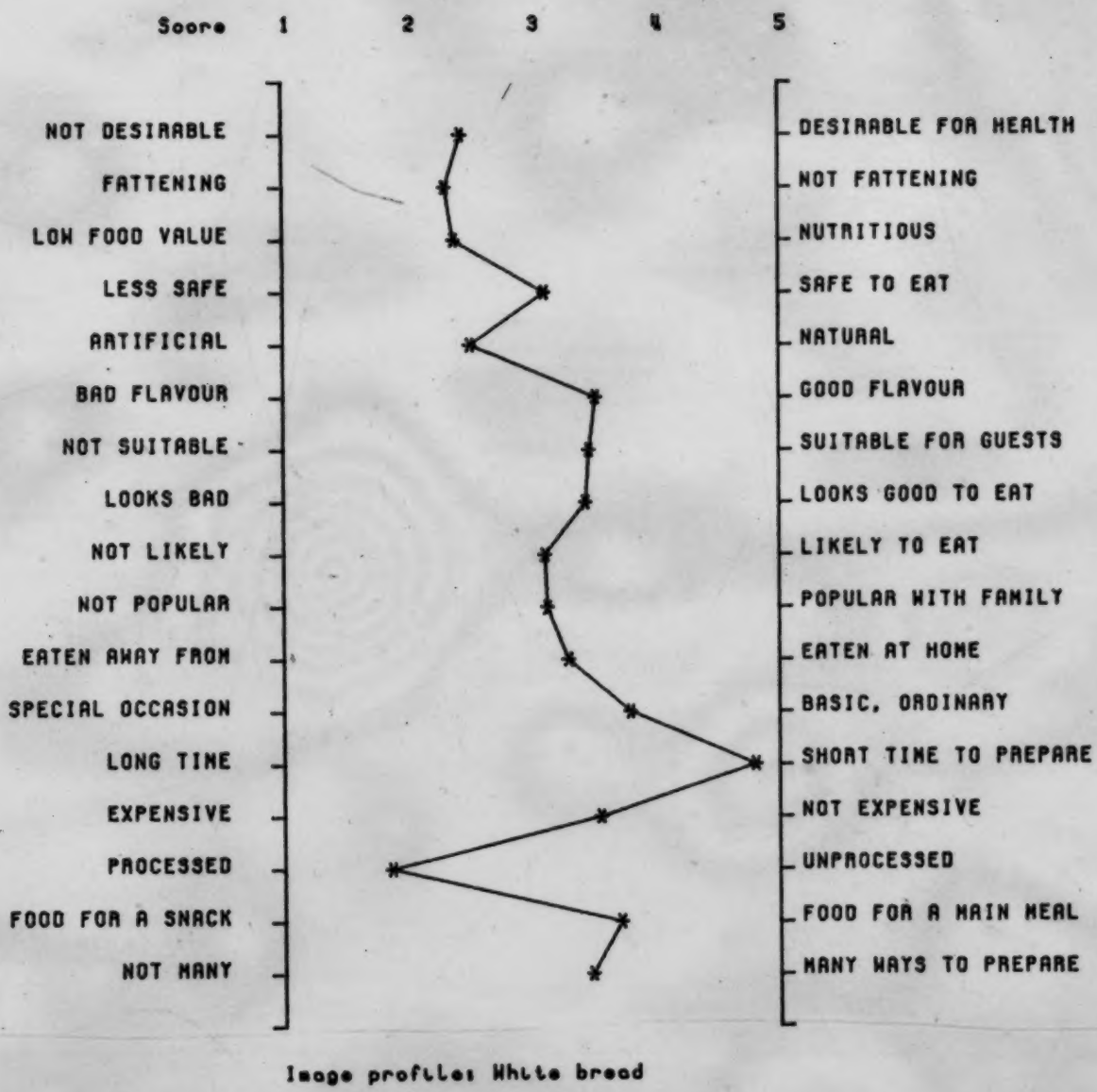


Image Profile 25. Diagrammatic representation of respondent attitudes to White Bread.

* represents the mean response score for each construct